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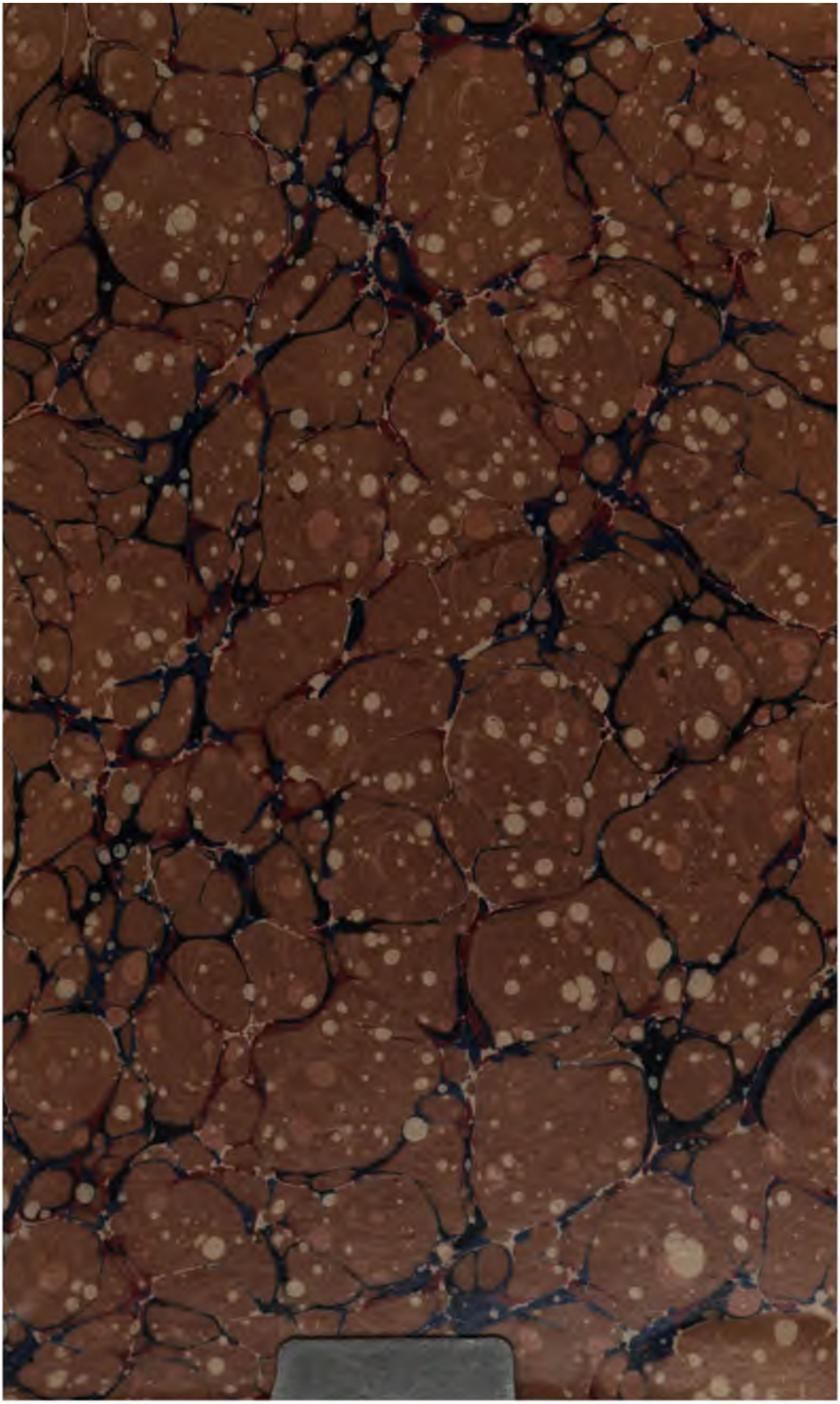

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JOURNAL

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Vol. XV. MARCH, 1907. No. 1

Class I, HEXAPODA.

Order IV, DIPTERA.

DIPTEROLOGICAL NOTES.

By S. W. Williston,

Chicago, Ill.

In the revision of my Manual of North American diptera, shortly to be published, a number of changes in, or additions to, the nomenclature of American flies have been found necessary, some of the more important of which are here given.

For *Ceratolophus* Kieffer (Chironomidæ), preoccupied, the name Johannseniella is substituted, in honor of Professor Johannsen.

For *Snowia*, sive *Sackeniella* Williston (Blepharoceridæ), preoccupied, the name Kelloggina in honor of Professor Vernon Kellogg, is substituted.

For *Bombylius ater*, *syndesmus*, *albopenicillatus*, *dolorosus*, and certain other, South American, species (Bombyliidæ), some of which have been incorrectly referred to *Triptotricha* Rondani, the genus Parabombylius, new, is proposed, especially characterized by the open or very narrowly closed first posterior cell. The known species have a silvery spot at each side of the base of the antennæ.

For '*Neolaparus*' *pictitarsis* Bigot (Asilidæ) the genus Chrysoceria, new, is offered.

For *Hyperechia atrox* Williston, the genus Dasylechia is proposed, differing from *Hyperechia* Schiner in the structure of the antennæ, face and proboscis.

For a southern species of Asilidæ of small size, allied to *Leptogaster*, but differing in the possession of but four posterior cells, in the entire absence of the sixth vein, and in the extraordinarily attenuated basal part of the wing, the genus LEPTOPTEROMYIA is proposed.

For *Melanostoma scitulum*, *rugonasus*, *melanocerum*, etc. (Syrphidæ) the genus RHYSOPS is proposed. It is especially characterized by the elongate antennæ and the presence of transverse ridges and grooves on the face.

Xanthandrus Verrall is represented in Central and South America by *Syrphus* (*Melanostoma*) *bucephalus* Wied. (Syrphidæ).

The genus *Leucophenga* Mik (Drosophilidæ) is represented, among other species, by *Drosophila frontalis* Williston.

Lytogaster Becker (Ephydridæ) is recognized in two new species, one from Illinois, the other from Brazil.

The genus *Paramyia* (Agromyzidæ), hitherto known only from Grenada, has a species in Georgia.

For *Heterochroa ornata* Johnson (Geomyzidæ) the new genus SPILOCHROA is proposed. *Heterochroa* Schiner is a heteroneurid.

It may interest students of diptera to learn that the new edition of the Manual will contain nearly one thousand figures, illustrating between six and seven hundred of the North American genera.

The following well-known American dipterologists have contributed the discussion and tables of the listed families: Professor Adams, the Tachinidæ and Dexiidæ; Professor Aldrich, the Dolichopodidæ; Professor Brues, the Phoridæ; Professor Hine, the Tabanidæ; Professor Johannsen, the Chironomidæ; Professor Kellogg, the Blepharoceridæ; Professor Melander, the Empididæ.

◆

ADDITIONS TO MY CATALOGUE OF NORTH AMERICAN DIPTERA.

BY J. M. ALDRICH,

MOSCOW, IDAHO.

Since the appearance of the Catalogue, in May, 1905, I have been looking up literature, omissions, etc. Several entomologists kindly sent lists of species omitted, Dr. Johannsen in particular including most of the following in his list.

While spending the college year 1905–6 at Stanford University, I was enabled to examine almost all the literature that I had not before seen, the libraries of the California Academy of Science and of the University of California being especially rich in entomological literature. Unfortunately the former has now been entirely destroyed.

The following additions are for the purpose of completing the Catalogue up to January 1, 1904, and not to bring it down to a later date.

Bigot's fragments in the Bulletin I have now straightened out, but I doubt if their importance would justify the use of a page or two of space to elucidate them.

Most of the omissions are clerical mistakes, due to insufficient checking up of my work; only a few papers describing new species escaped me. As the Catalogue was prepared in odd moments, evenings, holiday vacations, Saturdays, etc., through a period of seven years, I presume I need not apologize for my inability to avoid these errors, although I keenly regret that they occur in the finished work.

ADDITIONAL GENERA AND SPECIES.

CHIRONOMUS.

halophilus PACKARD, Proc. Essex Inst., VI, 41; Report upon the Invert. Animals of Vineyard Sound. — Mass.; larvæ in seawater; adult not described.

PLESIASTINA.

mexicana GIGLIO-TOS, Boll. R. Univ. Torino, VI, no. 84. (*Ditomyia.*) — Mex.
MIK, Wien. Ent. Zeit., XIII, 26, gen. ref.
zonata GIGLIO-TOS, Boll. R. Univ. Torino, VI, no. 84. (*Ditomyia.*) — Mex.
MIK, Wien. Ent. Zeit., XIII, 26, gen. ref.

EUDICRANA (p. 140, before *Sciophila*).

LOEW, Cent., IX, 23, 1869.
obumbrata LOEW, loc. cit. — New York.

SCIARA.

æqualis WILLISTON, Trans. Ent. Soc. Lond., 1896, 265, in table, no desc. — St. Vincent, W. I.
cingulata RÜBSAAMEN, Berl. Ent. Zeitsch., XXXIX, 31, pl. I and III. — Ga.
picea RÜBSAAMEN, Berl. Ent. Zeitsch., XXXIX, 32, pl. I and III. — Ga.

ODONTONYX (p. 148, before *Rhynchosciara*).

RÜBSAAMEN, Berl. Ent. Zeitsch., XXXIX, 25, 1894.
helveolus RÜBSAAMEN, loc. cit., 27, pl. II and III. — Porto Rico.

RHYNCHOSCIARA (p. 148, before *Sciara*).

RÜBSAAMEN, Berl. Ent. Zeitsch., XXXIX, 29, 1894.
villosa RÜBSAAMEN, loc. cit., 29, pl. I-III. — Oaxaca, Mex., and S. A.

DIPLOSIS.

pictipes Williston, Trans. Ent. Soc. Lond., 1896, 253. — St. Vincent, W. I.

CECIDOMYIA.

vaccinii Osten Sacken, Monogr. N. A. Dipt., I, 196, gall and larva. — D. C., on Vaccinium.

atriplicis Townsend, Amer. Nat. XXVII, 1021. — On *Atriplex canescens*; gall only.

PLECIA.

quadrivittata Williston, Biologia, Dipt., I, 222. — Guerrero, Mex.

DILOPHUS.

stygius Say (*Bibio*), Ins. of Louisiana, 15; Compl. Works, I, 305, with note on preoccupation. — La.

STRATIOMYIA.

nigriventris Loew, Cent., VI, 15, from Nebraska, is made a synonym of Str. *meigenii* by Johnson.

EUPARYPHUS.

major Hine, Ohio Nat., I, 112. — Boulder, Col.

AKRONIA p. 185, before *Nemestrina*.

Hine, Ohio Nat., I, 113, 1901.

frontosa Hine, loc. cit., fig. — Akron, Ohio.

SYMPHOROMYIA.

limata Coquillett, Jour. N. Y. Ent. Soc., II, 54. — S. Cal.

DISCHISTUS.

fuscipes Bigot, Annales, 1892, 360. — N. A. Coquillett has made this a synonym of *Sparnopolius fulvus*, Trans. Amer. Ent. Soc., XXI, 101.

SPOGOSTYLUM.

succinctum Coquillett, Trans. Amer. Ent. Soc., XXI, 96 (*Argyramoeba*). — Ariz.

EXOPROSOPA.

trabalis Loew, Cent., VIII, 20. — Mex.

ANTHRAX.

jaennickeana Osten Sacken, Biologia, Dipt., I, 87, pl. III, fig. 4 (*Argyramoeba*). — N. Sonora, Mex.

sodom Williston, Dipt. of Death Valley, 254 ([illegible]). — Death Valley, Cal.

SYSTŒCHUS.

solitus Walker, List, II, 255 (*Bombylius*). — Fla.

Osten Sacken, West. Dipt., 253, notes; [illegible] S. Cal. also mentioned.

HENICOMYIA p. 246, before *Psilocephala*.

Coquillett, Jour. N. Y. Ent. Soc., VI, 187, 1898.

hubbardii Coquillett, loc. cit. — Ft. Grant, Ariz.

THEREVA.

novella COQUILLETT, Canad. Ent., XXV, 200.— Los Angeles Co., Cal.

ATOMOSIA.

pusilla MACQUART, Dipt. Exot., 1, 2, 76.— N. A.

DASYLLIS.

albicollis BIGOT, Annales, 1878, 229.— Mexico.

ERAX.

dubius WILLISTON, Trans. Amer. Ent. Soc., 1885, 64, mentioned in the table; the "Erax n. sp." described on p. 68 of the article is the same, according to Snow, Kans. Univ. Quart., IV, 184, 1896.

PSILOPODINUS.

carolinensis BIGOT, Bull. Soc. Ent. France, 1888, xxix (*Psilopus*).—Carolina.
occidentalis BIGOT, Bull. Soc. Ent. France, 1888, xxix (*Psilopus*).— Cal.
pampæcilus BIGOT, Bull. Soc. Ent. France, 1888, xxix (*Psilopus*).— Hayti.
astequinus BIGOT, Bull. Soc. Ent. France, 1888, xxx (*Psilopus*).— Mex.

AGONOSOMA.

pallescens BIGOT, Bull. Soc. Ent. France, 1888, xxix (*Psilopus*). — North Carolina.

polychroma BIGOT, Annales, 1890, 289 (*Psilopus*).— Hayti.

RHAMPHOMYIA.

morrisoni BIGOT, Bull. Soc. Ent. France, 1887, cxli; Annales, 1889, 132 (both *morissoni*).— Nevada.

NAUSIGASTER.

unimaculata TOWNSEND, Annals and Mag. Nat. Hist., XX, 24.— Cal.

MELANOSTOMA.

bellum GIGLIO-TOS, Bull. R. Univ. Torino, VII, no. 132; Ditt. del Mess., II, pl. II, f. 7, 7*a*.— Mex.

SPHÆROPHORIA.

syrphica GIGLIO-TOS, Bull. R. Univ. Torino, VII, no. 132; Ditt. del Mess., II, pl. II, f. 5, 5*a*.— Orizaba, Mex.

VOLUCELLA.

trigona GIGLIO-TOS, Bull. R. Univ. Torino, VII, no. 123; Ditt. del Mess., I, 52. — Orizaba, Mex.

CRIORHINA.

nigra WILLISTON, Synops. N. A. Syrph., 214 (*Cynorhina*).— White Mts., N. H.

CONOPS.

quadrimaculatus ASHMEAD, Orange Insects, 69, f. 63.— Fla.

SARCOPHAGA.

? despecta THOMSON, Eugenies Resa, 540. — Puna; a doubtful variety from Panama.

PHORBIA.

cepetorum Meade, Ent. Mo. Mag., XIX, 218. — England and New York, the larvæ affecting onions in both places.

SCIOMYZA.

albovaria Coquillett, Proc. U. S. N. M., 1901, 616.—N. Y., N. H., N. C.

SEPSISOMA (p. 599, before *Stenomacra*).

Johnson, Ent. News, XI, 327, 1900.

flavescens Johnson, loc. cit., fig.— Westville, N. J.

EUTRETA

nova Doane, Jour. N. Y. Ent. Soc., VII, 184, pl. III, f. 9.— Idaho.

TEPHRITIS.

baccharis Coquillett, Canad. Ent., XXVI, 73. — S. Cal.; larva makes a gall on *Baccharis viminea*.

CANACE (after Cænia, p. 631).

Hаliday, Ann. Nat. Hist., III, 411, 1833.

snodgrassi Coquillett, Proc. Wash. Acad. Sci., III, 378, 1901.—Galapagos Ids.
Johnson, Ent. News, XIV, 100, oc. in New Jersey.

SEPSIS.

cynipsea Linné, Fauna Suecica, p. 459 (*Musca*). — Europe.
Schiner, Fauna Austr., II., 179.
Cockerell, Proc. Davenport Acad. Nat. Sci., VII, 155, oc. in New Mexico, at Santa Fé and Mesilla (det. Coq.).

BRACHYPTEROMIA.

fimbriata Waterhouse, Proc. Zool, 1887, 163 (*Anapera*).—Ft. Wingate, N. M., on *Cypselus melanoleucus*.
Williston, VII, 185 (*femorata*). — Wyoming, on same bird. [Speiser.]

MEGISTOPODA.

desiderata Speiser, Archiv. f. Naturgeschichte, 1900, 57, pl. III, f. 6. —Cuba and Brazil, on *Phyllostoma* sp. This is acknowledged by Speiser to be a synonym of *Pterellepsis aranea* Coq.

ORNITHOPERTHA.

geniculata Bigot, Humming Bird, II, 49, 1892. — On *Phasomacrus costaricensis*.
Speiser, Ann. Mus. Nat. Hungar., II, 393. Speiser *in litt.* gives the occurrence as Honduras, Costa Rica and Panama.

ADDITIONAL LITERATURE.

Bigot, J. M. F. Notes without title in Bull. Soc. Ent. France, 1888, XXIX and XXX. Contains descriptions of *Psilopus pallescens*, *carolinensis*, *occidentalis*, *pampæcilus*, and *astequinus*, new.

Bigot, J. M. F. In The Hummingbird, vol. II, 49, is *Ornithopertha geniculata*, from Central America.

Hine, J. S. Descriptions of New Species of Stratiomyidæ, with Notes on others. Ohio Naturalist, I, 112–114, fig. 11; May, 1901. Contains *Akronia frontosa* (n. gen. and sp.), *Euparyphus major*, n. sp., and a few notes.

Rübsaamen, Ew. H. Die Aussereuropäischen Trauermücken des Königlichen Museums für Naturkunde zu Berlin. Berl. Ent. Zeitsch., XXXIX, 1894, 17–42, 3 pl.

Contains *Odontonyx* and *Rhynchosciara*, new gen.; *Odontonyx helveolus*, *Rhynchosciara villosa*, *Sciara cingulata*, *picea*, and *striata*; *Sciara nigra* Wied. redescribed and referred to *Odontonyx*.

Meade, R. H. Annotated List of British Anthomyidæ, Ent. Mo. Mag., XIX, 218, describes *Phorbia cepetorum*, an onion fly common to England and New York.

Speiser, P. Archiv für Naturgeschichte, 1900, 57, description of *Megistopoda desiderata*, a synonym of *Pterellepsis aranea*.

Waterhouse, C. O. Note on a New Parasitic Dipterous Insect of the Family Hippoboscidæ. Proc. Zool. Soc. Lond., 1887, 163, 164, fig. *Anapera fimbriata*, new, of which Williston's *Brachypteromyia femorata* is a synonym.

Ricardo, Miss Gertrude. A series of articles on the Tabanidæ of the British Museum, etc., in annals and Mag. Nat. Hist., ser. 7. Vol. V, 97–121; Jan., 1900. V, 167–182; Feb., 1900. VIII, 286–315; Oct., 1901. IX, 366–381; May, 1902. IX, 424–438; June, 1902.

These articles include many notes on the types of Walker and Bigot. The nomenclature is changed in the following cases:

Chrysops æstuans becomes a synonym of *mœrens*;
Chrysops atropos becomes a synonym of *divisus*;
Chrysops fugax becomes a synonym of *carbonarius*;
Chrysops nigriventris becomes a synonym of *pertinax*;
Chrysops furcatus is a valid species, not *striatus*.

TYPOGRAPHICAL ERRORS, ETC.

Page 9, midway, after *Holorusia rubiginosa*, add p. 139.

Page 9, lower, read **Beutenmüller**.

Page 10, lines 6, 8, and 14 from bottom, the year should be 1884, 1883, and 1881, respectively; in the third line from bottom, 241 should be 247.

Page 14, line 13, read **Bergenstamm**.

Page 15, third line, read **XANIONOTUM**, and the same on p. 340.

Page 16, line 11, for 224 read 324.

Page 24, third line, read *Physocephala*.

Page 90, 12th line from bottom should begin with the specific name **superlineata**.

Page 105, under *Dixa centralis*, add — Dyar, Proc. Ent. Soc. Wash., V, 136, larva partly described.

Page 110, under *Ceratopogon varicolor*, add Dyar, Proc. Ent. Soc. Wash., V, 58, figs. pupa.

Page 111, under *Chironomus anonymus*, add Dyar. Proc. Ent. Soc. Wash., V, 57, desc. and figs. larva and pupa.

Page 113, under *Chironomus modestus*, add Dyar, Proc. Ent. Soc. Wash., V, 57, desc. and figs. larva and pupa.

Page 118, under *Tanypus dyari*, add Dyar, Proc. Ent. Soc. Wash., V, 56, notes; figs. larva and pupa.

Page 124, read **TOXORHYNCHITES.**

Page 149, omit *Scaria alternata.*

Page 150, the name of *Sciara glacialis* Lundbeck was changed to *permutata* by Lundbeck, Dipt. Groenl. II, 313.

Page 156, the articles on *Asphondylia atriplicis* by Townsend and Cockerell were in the American Naturalist, not Annals, etc.

Page 160, 3d line from bottom, read *tergata* for *togata.*

Page 166, *Bibio fuliginosus* should be *fuligineus.*

Page 197, for *Chrysops nigribimbo* read *nigrilimbo.*

Page 217, second line from bottom, read *plagens* for *plangens.*

Page 220, under *Acrocera fasciata*, add ?Emerton; Psyche, V, 404, figs. larva and adult; reared from *Amaurobis sylvestris.* Doubtfully ident.— Waltham, Mass.

Page 275. Dr. M. Bezzi referred me to Dipterenfauna Südafrikas, p. 142 (214), line 13, for the name *Anarmostus*, which I find to be correct.

Page 315, read **LITANOMYIA.**

Page 316, read **BOREODROMIA** instead of **BOREOMYIA.**

Page 333, read *pulchripes* instead of *pulchriceps.*

Page 421, line 13, *setigena* should read *setigera.*

Page 463, *Frontina chrysopygata* was first described as *chrysopyga*, in Bull. Soc. Ent. France, 1887, cxli.

Page 466, *Masicera polita*, the locality should be White Mts., New Mexico.

Page 473, *Blepharapeza trichopus* should be *trichopsis.*

Page 480, *Gædiopsis cockerelli*, the locality should be White Mts., New Mexico.

Page 509, *Homodexia flavipes*, strike out the reference to the Bull. Soc. Ent. France.

Page 510, under *Sarcophaga*, before the note, add Wheeler, Psyche, V, 403, an undet. sp. bred from pocket-like cavity in neck of turtle (*Cistudo carolina*).

Page 526, *Morellia callimera* was first described as *Curtoneura callidimera*, in Bull. Soc. Ent. France, 1887, clxxxi.

Page 528, under *Musca domestica*, add Macloskie, Amer. Nat. XIV, 153–161, figs., anat. of proboscis.

Page 578, *Sciomyza vittata* should be replaced by the following :

ANTICHÆTA.

Haliday, Ann. Nat. Hist., II, 187, 1838.
Hendel, Rev. Sciomyz., 78, 1902.

analis Meigen, Syst. Beschr., VI, 15 (*Sciomyza*).— Europe.
Haliday, Ent. Mag., I, 168 (*Tetanocera vittata*).
Rondani, Atti Soc. Ital. Sc. Nat., 1868, 329 (*Sciomyza vittata* Hal.); Ann. dell Soc. Nat. Modena, 1877, 47 (*id.*).
Osten Sacken, Cat. 177, oc. in N. A., on authority of "Loew *in litt.*"
HENDEL, Revis. Sciomyz., 79.

Page 593, *Ortalis platycnema* should be *platystoma.*

Page 598, *Steneretma latiuscula* should be *laticauda.*

Page 618, midway, *Madiza annulicornie* should be *annulitarsis.*

Page 619, *Nemopoda cubensis* Bigot, Annales, 1886, 390.

Page 620, *Nemopoda cæruleiformis* should read *cæruleifrons*.

Page 652, under *Leucopis nigricornis*, add Needham, Psyche, 1903, 27, larvæ feed on *Aphis cephalanthi*. — Lake Forest, Ill.

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DESCRIPTIONS OF SOME AMERICAN MOSQUITOES.

By Harrison G. Dyar and Frederick Knab,

Washington, D. C.

Aëdes angustivittatus, new species.

Proboscis brown; palpi entirely dark; head with a narrow pale margin behind the eyes and the vertex broadly pale scaled; thorax brown with two narrow longitudinal golden yellow stripes extending the entire length, connected at the front margin by a narrow transverse stripe of the same color. In front of the base of the wing are many pale golden hairs. Pleura pale scaled. Abdomen black above, with light lateral patches at the front angles of the segments, beneath creamy white, segments with a narrow black margin behind. Legs dark, unbanded, the femora pale beneath and at base. All tarsal claws toothed in the female.

25 specimens, Port Limon, Costa Rica; Zent, 20 miles from Port Limon; Rio Aranjuez, near Puntarenas, Costa Rica (F. Knab); Bluefields, Nicaragua (W. F. Thornton).

Type. — Cat. no. 10140, U. S. Nat. Mus.

Nearly allied to *Aëdes trivittatus* Coquillett, but the golden thoracic lines are narrower.

Aëdes obturbator, new species.

Proboscis brown; palpi dark; head behind the eyes pale yellowish; at the sides a dark spot; thorax bronzy yellow, a median dark brown stripe running the whole length, the lateral margin brown with irregular outline; the scutellum is silvery; pleura pale scaled. Abdomen black above, with white basal bands; beneath entirely pale. Legs dark, unbanded, the femora pale beneath. All tarsal claws toothed in the female.

22 specimens, Tarpon Bay, Bahama Islands (T. H. Coffin).

Type. — Cat. no. 10141, U. S. Nat. Mus.

Allied to *Aëdes auratus* Grabham, but the thorax has a brown median band.

Aëdes balteatus, new species.

Proboscis black; palpi black; head behind the eyes pale bronzy, a large dark spot on each side; thorax bronzy yellow on the disk, a rounded deep brown patch on the front of the lateral margin, scutellum silvery. Abdomen black above, with narrow basal pale bands; beneath pale, the hind angles of the segments black. Legs black, unbanded, femora pale beneath. Tarsal claw formula of the female, 1.1-1.1-0.0.

6 specimens, Santo Domingo, West Indies (A. Busck).

Type. —Cat. no. 10152, U. S. Nat. Mus.

Closely resembling *Aëdes auratus* Grabham, but the claws of the hind tarsi are simple.

Aëdes thorntoni, new species.

Proboscis and palpi black; head behind the eyes dark with a purplish luster, the margin of the eyes silvery, broadened at the sides; thorax violaceous black, the anterior portion silvery white for nearly half with a dark indentation at the middle; two small silvery spots near the hind margin. Abdomen above and beneath violaceous black, each segment with narrow silvery transverse bands below. Pleura silvery scaled. Fore legs deep black, first and second tarsal joints narrowly white at base; middle legs black, the femora marked with silver on the under side for about two-thirds the length, not attaining the base, apex silvery, base and tip of the first tarsal joint and base of the second broadly white; hind femora white, a black ring close to the base and another towards the apex, tibiæ black, first tarsal joint white-ringed at base and apex, second joint white-ringed at base. Tarsal claw formula of the female 1.1-1.1-0.0.

7 specimens, Bluefields, Nicaragua (W. F. Thornton).

Nearly allied to *Aëdes insolita* Coquillett and *Aëdes podographicus* Dyar & Knab, but differing from both in the details of the markings.

Type. — Cat. no. 10143, U. S. Nat. Mus.

Aëdes septemstriatus, new species.

Proboscis and palpi black; head bronzy yellow behind the eyes, two blue-black spots upon the vertex separated by a golden line; thorax deep brown with seven narrow golden lines and the front margin golden; a median dorsal line, narrow in front, broadened towards the scutellum, a narrow line on each side of it which stops at the basal fourth of the thorax, outside of these are two slightly oblique lines which extend from the base to the middle of the thorax, lateral marginal stripe extends down the sides in the form of large golden patches; pleura silvery. Abdomen blue-black with median white basal spots on some of the segments, the three last segments spotted with silver at the sides; under surface black with white bands. Legs: first pair black, the base of the first tarsal joint silvery; middle legs black, knees silvery, hind legs black, femora tipped with silver, the base of the first tarsal joint silvery. Tarsal claws of the female simple.

3 specimens, Bluefields, Nicaragua (W. F. Thornton).

Type. —Cat. no. 10144, U. S. Nat. Mus.

Differs from any described *Aëdes* with simple claws known to us in the median dorsal thoracic line.

Aëdes quadrivittatus Coquillett.

Culex quadrivittatus Coquillett, Can. ent., xxxiv, 293, 1902.

An examination of the types of this species shows it to be referable to *Aëdes*, the tarsal claws of the female simple. Mr. Coquillett described it originally in comparison with *Aëdes atropalpus* Coq., with which it has no affinity, thus producing a misleading impression.

Aëdes fletcheri Coquillett.

Culex flavescens Theobald (not Fabricius, not de Villers), Mon. Culic, i. 410, 1901.

Culex fletcheri Coquillett, Proc. U. S. Nat. Mus., xxv, 84, 1902.

Culex arcanus Blanchard, Les Moust., 303, 1904.

Theobald's description of *Culex flavescens* from old specimens in the Hopeian Museum at Oxford appears to agree with our *fletcheri* from the Canadian prairies. We think it may be safely identified with this species.

Aëdes plutocraticus, new species.

Proboscis and palpi black; head clothed with creamy scales behind the eyes; thorax coppery bronze, a distinct dark brown spot occupying the anterior half laterally joined behind to the lateral brown area; medianly there are two rather ill-defined brownish stripes; abdomen black above, with narrow basal white bands, beneath white, the hind angles with black triangular spots. Wings dark brown, scaled. Legs black, the tibiæ and tarsi bronzy beneath; femora white on the under side. Claws of the female toothed.

63 specimens, Nassau, Andros, San Salvador, Tarpon Bay and Powell Point, Bahamas (T. H. Coffin).

Type. — Cat. no. 10251, U. S. Nat. Mus.

Aëdes condolescens, new species.

Proboscis black; head behind the eyes covered with silvery scales; thorax brown, a large silver patch on the disk anteriorly, reaching about three-fourths the length of the thorax, with a broad margin on each side of the brown scales; scutellum brown scaled; abdomen black above with basal white bands on the segments; beneath white with black spots at the hind angles; legs dark, the femora white basally, the white extending nearly to the apex on the under side. Wings dark brown scaled. Claws of the female toothed.

24 specimens, Nassau, Bahamas, June 24, 1903 (T. H. Coffin); Andros, San Salvador, Powell Point and Long Island, Bahamas (T. H. Coffin):

Type. — Cat. no. 10248, U. S. Nat. Mus.

Aëdes indolescens, new species.

Proboscis bronzy brown; head behind the eyes dull brown scaled, the margins of the eyes and a median line silver scaled; thorax bronzy brown, a broad silver patch on the disk, broadest at the middle and covering the anterior two-thirds of the thorax; abdomen black above, a pale bronzy longitudinal median line; beneath white, with triangular black spots at the angles of the segments. Legs dark, the hind femora mostly white, with a black apical ring; hind tibiæ with a pale longitudinal stripe on the under side, stopping short of the apex. Wing veins brown scaled. Claws of the female toothed.

30 specimens Cayamas, Cuba (E. A. Schwarz); Havana, Cuba (J. W. Taylor); Santo Domingo, West Indies (A. Busck).

Type. — Cat. no. 10249, U. S. Nat. Mus.

Aëdes hortator, new species.

Proboscis and palpi black; thorax yellowish, the vestiture consisting of golden yellow and bronzy brown scales intermixed, the yellow predominating; abdomen violet black, the fifth and sixth segments with white basal lateral patches, beneath white; legs dark, hind femora white with black apices. Wing veins brown scaled. Claws of the female toothed.

2 specimens, Trinidad, B. W. I. (F. W. Urich).

Type. — Cat. no. 10250, U. S. Nat. Mus.

Genus MEGARHINUS Robineau-Desvoidy.

Megarhinus superbus Dyar & Knab.

Megarrhina hæmorrhoidalis Osten Sacken (not Fabricius), Cat. Dipt. N. A., Smiths. Misc. Colls., 18, 1878.

Megarhinus superbus Dyar & Knab, Smithsonian Miscellaneous Coll. (Quart. Iss.), xlviii, 255, 1906.

Mr. S. Henshaw has kindly sent us for examination the three specimens from the Loew collection on which Osten Sacken based his Cuban record of *hæmorrhoidalis* Fab. They prove to be our species.

Since we characterized this species, two additional specimens of the female have come to hand, through the kindness of F. W. Urich. These show the red lateral tufts on the seventh segment, though less pronounced than in the male. The red cilia occupy only the posterior two thirds of the margin, while on the eighth segment they appear to be absent altogether. Mr. Urich writes: "These Megarhini are so wild when they emerge, that they damage themselves a great deal if not killed soon." We have also received two males of this species from Bluefields, Nicaragua, through Dr. W. F. Thornton.

Megarhinus septentrionalis Dyar & Knab.

Megarhinus septentrionalis Dyar & Knab, Smithsonian Misc. Coll. (Quart. Iss.), xlviii, 249, 1906 (Sept.).

Megarhinus herrickii Theobald, The Entomologist, xxxix, 241, 1906 (Nov.).

Mr. Theobald obviously redescribes our species, having independently recognized that the continental North American form is not conspecific with the one from Porto Rico.

Genus ANOPHELES Meigen.

Anopheles quadrimaculatus Say.

Through the kindness of Dr. A. Handlirsch of the Vienna Museum, Dr. C. von Kertész of the Hungarian National Museum, Prof. R. Blanchard of the Faculty of Medecine of Paris and Mr. F. V. Theobald, we have become possessed of a number of specimens of the European *Anopheles maculipennis* Meig. These abundantly establish our contention of the distinctness of this form from any of the American species. *Maculipennis* is nearer to the Californian *occidentalis* D. & K. than to the Eastern *quadrimaculatus* Say, but lacks the apical yellowish wing spot characteristic of *occidentalis*.

Genus CULEX Linnæus.

Culex toweri, new species.

Head behind the eyes margined with silvery gray; thorax clothed with rather pale yellowish brown scales above with faint traces of dorsal stripes; abdomen entirely black above, beneath with white lateral basal spots and a pale median area. Wings with the veins and fringe dark brown scaled. Hind legs black with the first to fourth tarsal joints narrowly white ringed at both ends, fifth joint white ringed at the base; knees white tipped, tibiæ rather broadly white tipped; on the first and second pairs of legs the annulations are much reduced. Proboscis and palpi black.

39 specimens, Mayaguez, Porto Rico (W. V. Tower).

Type. — Cat. no. 10222, U. S. Nat. Mus.

The larva falls with *Culex lamentator* D. & K. in the table and is much like it, but the adults are quite distinct.

Culex fur, new species.

Proboscis black; head broad, black behind the eyes; thorax with the anterior half covered with brassy scales, two large dark patches within this area on the disk before; posterior half of the thorax deep brown. Abdomen black above, the hind margins of the segments with yellowish hairs; beneath dirty gray. Legs black. Wings brown scaled along the veins, the scales on the apical portion bread. Tarsal claws simple.

One specimen, ♀, Colon, Panama (A. C. H. Russell).

Type. — Cat. no. 10259, U. S. Nat. Mus.

The larva is unknown to us.

AN EARLY ACCOUNT OF THE COPULATION OF STEGOMYIA CALOPUS.

BY FREDERICK KNAB,

WASHINGTON, D. C.

In the third volume of the *Mémoires de Mathématique et de Physique*, published in 1760, the French commander Godeheu de

Riville gives an enthusiastic and detailed account of his observations on the copulation of mosquitoes. He puts the facts on record in the belief that his was the first observation of the kind. However the *Acta* of the old Leopold-Carolinan Academy in 1737 contained a notice of the copulation of mosquitoes by the Spaniard Diego Reviglias, communicated in a letter dated 4 March, 1728.

The account of Reviglias is mainly directed towards refuting the then generally accepted doctrine that insects did not reproduce themselves but were the product of processes of decomposition. A pair of mosquitoes found united formed the basis of this essay and the mode of copulation and the structure of the male and female genitalia are carefully described. However nothing is said of the mating habits and at present the article has little more than an historical interest. Incidentally it may be noted that the mosquito-pair was kept under a glass until they died and for some time thereafter. A small hairy "worm," doubtless a dermestid larva, subsequently made its appearance and was concluded to be the product of the union of the mosquitoes.

The account of Godeheu de Riville gains especial interest at present in that, through seemingly trivial details, we are able to identify the mosquito he had under observation, with, I may say, positive certainty. To the uninitiated this assertion will appear quite incredible; yet, with the data on the copulation of mosquitoes that we now have at hand, the species in question can be pointed out with assurance as *Stegomyia calopus*. I will first give in short the essentials of Godeheu de Riville's account and then point out the grounds upon which I base my conclusions.

Godeheu de Riville, on a return voyage from India, directed his efforts to the discovery of the copulation of mosquitoes, and he relates how his persistent efforts were at last successful. He dwells upon the conditions, exceptionally favorable to his purpose, which existed on board the ship on leaving Pondichery. The water brought on board at Pondichery swarmed with the larvæ and pupæ of mosquitoes but these all perished when the casks were sealed. Nevertheless a goodly number of mosquitoes survived in certain earthen jars in which drinking water was kept to preserve it in good condition. During the first three weeks, whenever the cover of one of these jars was lifted, a cloud of mosquitoes made its escape. The great number of mosquitoes present on board during the first few weeks after departure from Pondichery and the small area to which they were restricted led the commander to believe that the conditions were exceptionally favorable for accurate observation of their behavior. The warm climate and the abundance of "heating" food, he reasoned, should produce a stimulating effect upon the reproductive functions, and in consequence copulation should be more frequent and the opportunities for observation increased. On account of its small size the state-room seemed favorable for this purpose and the first three hours after noon, when the mosquitoes seemed most active, were selected as the most favorable time. The windows were closed against the wind, and after a sufficient number of mosquitoes had entered, the door was likewise closed. Thereupon the commander, his legs and hands well protected, and armed with a feather to drive off the mosquitoes that threatened his face, spent more than an hour each day in the close heat of his cabin, attentively watching the cloud of mosquitoes which surrounded him. In spite of the time spent nothing was discovered but the pursuit by the male, which was so much like that in butterflies (as described by Réaumur) that the commander did not consider it worth recording. Convinced that in the end his efforts would be successful he persisted in his observations. He became discouraged, however, when the ship fell into the cold winds off the Cape of Good Hope. The mosquitoes abandoned all the upper part of the ship and fled between decks for shelter, there to suck blood at will.

Shortly after the Cape had been doubled they reappeared again with the good weather. They all looked well nourished and all that were crushed were found to be filled with blood. The commander thereupon resumed his observations, encouraged further by having found females with the abdomen filled with white bodies which, under a strong lens, he recognized as eggs. These observations proved more decisive than the previous ones. He distinctly saw, flying past him, many couples of mosquitoes intimately united but in a manner different from that in other flies. Their flight slackened at intervals, when it could be seen that they were united face to face, their legs intertwined. From time to time couples fell upon the bureau and again took flight. Many couples that the commander crushed on the bureau-top showed the sexual parts intimately united. Still he thought that he might have been deceived by the manner in which their delicate bodies had been crushed together. It was difficult to obtain proof owing to the fact that copulation took place in the air, during rapid flight, and lasted only a very short time. Convinced of the impossibility of closely studying them in a stationary position he gave up further observation.

However, upon May 13, a lucky chance permitted him to observe what for more than two months had been the object of his research. Seeing a pair of mosquitoes united and hovering in a sun-beam he gently approached them to obtain a better look. Escaping him they flew to the rear of the cabin where, after an irregular flight, they entered the canopy of the bed and alighting remained suspended from the under side of the canopy-top. Here the light yellow color of the cloth contrasted well with the dark bodies of the mosquitoes and this proved to be the long desired opportunity. Waiting until they had become well settled he approached cautiously. The female, recognized by the length and stoutness of her body, sat in the ordinary position of mosquitoes ; she clung to the fabric with her front and middle legs, the two hind legs elevated in a half-circle above her wings. The male, on the contrary, had assumed a different attitude. The smaller size of his body and the necessity of obtaining union with the female, who did not seem inclined to incommode herself, left him apparently less at ease. His two greatly elongated front legs alone held him to the top of the canopy while with the other four legs he grasped the female. In spite of their movements, the commander was able to study them well and settle all doubts. An involuntary move on his part, caused by the rolling of the vessel, startled the pair from its resting-place. Still united they tried to obtain a new hold, but without success, and finally flew off and were lost to view, having probably separated.

From his observations Godeheu de Riville concluded that copulation in mosquitoes does not last long, takes place very quickly in comparison with other flies, and appears to occur only in the air. He considers that the attitude assumed does not permit them to alight, and that the one couple thus observed was a rare exception. None ot the many other couples which he attempted to observe more closely came to a resting position.

Thus runs the account of Godeheu de Riville. It may be added that this old record furnished the foundation for the statement made by several writers that with the mosquitoes the position in copulation is face to face. From this single observation, like that of the egg-laying habit of *Culex pipiens* by Réaumur, it has been wrongly inferred that such were the habits of the Culicidae in general. More recent observations, by the writer and others, show that there are two distinct modes of copulation in this family, each correlated with a difference in claw structure in the female. The mode described above obtains in the species in which the claws of the female (first and second, or all three pairs of feet) are toothed. It has been observed in *Stegomyia calopus* by Goeldi and the writer, and in *Aëdes varipalpus* by Dr. H. G. Dyar. These, together with the record of Godeheu de Riville, are the only authentic observations known to the writer of this mode of copulation. The other mode appears to be common to all the species in which the female has simple claws. In the case of these copulation likewise takes place in the air but differs strikingly in the relative position of the two sexes. When the two sexes meet in the air they grapple for a moment until union is effected, then, releasing their hold of each other, continue flight united but facing in opposite directions. The heavier female drags the male after her, the longitudinal axes of their bodies forming a straight line. The writer has observed copulation in this manner in *Anopheles punctipennis* and *Culex pipiens*, and Dr. Dyar in *Culiseta consobrinus*.*

With the above data on the mating habits of mosquitoes we can now approach the question of the identity of the species observed by Godeheu de Riville. From the description it is very clear that the species was one in which the claws of the female are toothed. Moreover there are but very few species of mosquitoes that are sufficiently domesticated to breed on board ship. Of all the species with toothed claws *Stegomyia calopus* is the only one that has to any degree associated itself with man, and indeed, as is well known, has been disseminated by shipping throughout the warmer regions of the earth. Another factor that points conclusively to *Stegomyia calopus* is the fact, brought out in Godeheu de Riville's account, that the mosquitoes were most active during the warmest hours of the day, a characteristic habit of this species. There is no other species that comforms with these requirements: domesticity, character of the toothed claws in the female carrying with it a face to face union of the sexes, and strictly diurnal habits.

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* Contradictory of these observations, Dr. A. Eysell credits both *Anopheles* and *Culex* with the mode of copulation first described (Archiv f. Schiffs-u. Tropen Hyg., v. 9, p. 51, 1905). In the case of *Anopheles* his statement is credited to the observation of Schaudinn, but I have so far been unable to find the original record. For *Culex* his basis is a note by Grassi on *Culiseta spathipalpis* (Studi di uno zoologo sulla malaria, p. 84, 1900). Dr. Eysell's assertion is evidently based on a misinterpretation, for a careful study of the original text reveals nothing that indicates the relative position of the two sexes.

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Class I, HEXAPODA.

Order V, LEPIDOPTERA.

DESCRIPTION OF THE LARVA OF TORTRICIDA FISKEANA DYAR.

By HARRISON G. DYAR,

WASHINGTON, D. C.

A single larva of this species was found at Tryon, North Carolina, on a Ceanothus bush, September 28, 1905. The adult emerged the following year, a female specimen, agreeing in coloration with the male. The larva is structurally a *Lithacodes*, and it will be better to refer the species to that genus, which differs as adult but slightly from *Tortricidia*.

Stage VII. Elliptical, rather elongate, tail subquadrate but not incised on the sides like *fasciola*, not prominent. Dorsum rather over one-third in the dorsal aspect, gently arched, narrowed to the ends; sides oblique, concave, the upper half nearly perpendicular, the lower more oblique to the lateral ridge. Subventral region retracted; head within the hood, which is again within joint 3. Setæ obsolete, very small, without raised tubercles; skin smooth, with rather sparse round clear granules, alike all over, without humps or irregularities even on the lateral ridge. The depressed spaces are without sharp, or even defined edges, the granulation running right across; they are of considerable depth, with the usual glands in the bottom. Dark yellow green, a little suffued with yellow in the dorsal space; a narrow yellow line in the subdorsal ridge, waved, touching depressed spaces (3) at the outcurves of the segmentary arcs, not joining at the ends; a similar but more diffused and rather paler line in the dorsal space, covering depressed spaces (2) at the incurves of the arcs, obsolete at the ends, meeting the subdorsal line intersegmentarily to form a row of dark green ellipses on the upper edge of the subdorsal ridge. A narrow yellow line along the lateral ridge, broken exactly above each spiracle, that is segmentarily posteriorly; no line on joint 3 transversely. Depressed spaces (1) single, annular, yellow, with glandular centers; (2) and (3) smaller, obscured by the yellow bands; (4) with a small yellow dot above and a large arc below, green centered; (5) and (6) in line above the lateral ridge, (5) large, segmentary, (6) small intersegmentary. Length, mature, 8 mm.

Cocoon. Small, rounded, brown, spun in the crevices or under bark. The larva left its plant without much change of color at first, but became pale yellowish on the second day. It wandered about till it encountered some bark, when it constructed its cocoon between two pieces.

A REVIEW OF THE TORTRICID SUBFAMILY PHALONIINAE WITH DESCRIPTIONS OF NEW AMERICAN SPECIES.

By August Busck.
Washington, D. C.

The subfamily Phaloniinæ comprises a natural group of moths, which are easily distinguished from all other Tortricidæ by having vein 2 in the fore wings emitted from the outer fourth of the cell. This character is always diagnostic. Several other characters are more or less common and peculiar to the species of the group, and the general habitus normally indicates the subfamily to a student of Tortricidæ, but the above named character is the safest final guide for the determination.

The genera of this subfamily are well separated on the venation alone without resort to the costal fold on the fore wings of the males which is objectionable as a generic character. The presence or absence of this fold with our present knowledge seems nearly persistent within the genera of the group; but it would not be surprising to find exceptions,* when our fauna becomes better known, and the character should not be depended upon as of more than specific value.

The following synoptic table may be utilized in separating the American and European genera of Phaloniinæ at present recognized.

Synoptic Table of the Genera of Phaloniinæ.

	Hind wings with all veins present; no pecten on median vein	1
	Hind wings with but 6 veins; median vein with pecten	*Carposina.*
1.	Fore wings with veins 7 and 8 stalked	2
	Fore wing with veins 7 and 8 separate or connate	3

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*One exception is found in *Commophila duponcheliana* Duponchel, which has a very small costal fold, while the other species of the genus, to which it is undoubtedly properly referred, have no costal fold.

2. Hind wings with veins 3 and 4 separate .... *Lozopera*.[*]
Hind wings with veins 3 and 4 stalked .... *Clysia*.[*]
3. Fore wings with vein 7 to apex or costa 4
Fore wings with vein 7 to termen 6
4. Hind wings with veins 3 and 4 separate .... *Phalonia*.
Hind wings with veins 3 and 4 connate or stalked 5
5. Fore wings with vein 11 strongly approximate to 10 .... *Phtheochroa*.[*]
Fore wings with vein 11 midway between 10 and 12 ...... *Commophila*.
6. Hind wings with veins 3 and 4 separate .... *Chlidonia*.[*]
Hind wings with veins 3 and 4 connate or stalked 7
7. Hind wings with veins 6 and 7 stalked .... *Pharmacis*.
Hind wings with veins 6 and 7 separate .... *Hysterosia*.

Pseudoconchylis Walsingham[†] does not belong in the Phaloniinæ where it was originally placed and has since been retained in our lists. It is a genus of the Tineidæ. *Phalonia unistrigana* Dyar,[‡] is also a Tineid and belongs to this genus. It is exceedingly close to if not identical with *laticapitana*, Walsingham; but considering the different localities it will be safer to retain it as distinct specifically until more material is at hand or the life history is worked out.

Thyraylia Walsingham[§], type *Phalonia bunteana* Robinson, I am unable to consider a valid genus. None of the characters given by Lord Walsingham differ from those of typical *Phalonia*. The males of *bunteana* have a curious secondary sexual character not mentioned by Lord Walsingham, namely, a costal fold on the hind wings, involving vein 8; but this should not be given more than specific importance. A similar fold, sometimes containing a hairpencil, is found in the males of several other species of *Phalonia*, as *felix* Walsingham, *rupicola* Curtis, *manniana* Fabricius, and to a less extent, not involving vein 8, in others, as *rutilana* Hübner and *badiana* Hübner; but it is not found in species otherwise closely related to these.

Anisotænia Stephens, which is placed by Mr. E. Meyrick[||] in this subfamily, has vein 2 of the fore wing arising before the outer third of the cell and I am inclined to refer it to the subfamily Tortricinæ.

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[*] Not known in America.
[†] Trans. Ent. Soc. London, p. 133, 1884.
[‡] Proc. Ent. Soc. Washington, V, p. 232, 1903.
[§] Proc. Zool. Soc. London, p. 138, 1897.
[||] Handbook Br. Lepid., p. 556, 1895.

Pharmacis Hübner is the same as *Euxanthis* Hübner, and preoccupies it, as already pointed out by Lord Walsingham.*

The generic name *Phtheochroa* Stephens, should be restricted to the type of this genus, *rugusana* Hubner, while *Commophila* should be used for the rest of the species at present included in that genus; *rugusana* differs strikingly from the others by its peculiar venation of the fore wings, which have vein 11 strongly approximate to vein 10, while in the other species it is about midway between veins 10 and 12. The result of this is that the upper internal vein originates between veins 11 and 12 instead of beyond 11, a very unusual character in the family.

Eupœcilia Stephens, which Meyrick utilized for *maculosana* Haworth† is, according to Walsingham,‡ a synonym of *Euxanthis* Hübner and he removes this species and *Commophila duponcheliana* to *Hysterosia* on the strength of their costal folds. *Commophila* is distinguished from *Hysterosia* by having vein 7 in the fore wings to costa or at least very close to apex, while *Hysterosia* has it distinctly to termen; *Commophila* is, however, more readily separated from *Hysterosia* by having more or less well developed raised scale-tufts on the fore wings, and I should on that ground retain *duponcheliana* in *Commophila*, where it certainly would be placed by its general habitus, regardless of the costal fold, which I consider merely specific.

Genus PHALONIA Hübner.

Fore wings with 7 to costa. Hind wings with 3 and 4 separate; 6 and 7 stalked.

This easily recognized genus is represented by many species in this country and the described forms are only a small portion of those that we have. Several European species have been recorded from America, but most of these records I am inclined to doubt.

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*Ann. and Mag. Nat. Hist. V., p. 488, 1900.

†Handbook Br. Lepid., p. 554, 1895.

‡Ann. and Mag. Nat. Hist. VI, p 446, 1900.

Erigeronana Riley, described and hitherto listed in this genus, is a *Pharmacis* as examination of the type in United States National Museum (U. S. N. M., type No. 379) proves.

P. vitellinana Zeller is also a *Pharmacis*.

Clemens' name *angustana* for which Robinson* substituted *dorsimaculana* on account of the European *angustana* Hübner, should be resurrected as the latter species does not belong to this genus but to *Pharmacis*.

Phalonia comes Walsingham belong to *Commophila* (see post.)

Phalonia atomosana, new species.

Labial palpi face head and thorax unicolored dirty ochreous. Fore wings light ochreous evenly suffused with darker ochreous scales and irregularly sprinkled with single black scales, especially along the extreme dorsal edge and before tremen. At the end of the cell is an aggregation of black scales and obliquely below and before these is a small black dash on the fold. Hind wings light ochreous fuscous. Abdomen ochreous. Legs ochreous with tarsal joints fainly annulated with black.

Alar expanse: 19–20 mm.

Habitat: Pittsburg, Pa. (H. Engel).

Type: U. S. N. M., No. 10223.

Of about the size and shape of *Phalonia floccosana* Walker, but with less clear ground color, without the darker dorsal shade and differing in the sprinkling of dark scales.

Phalonia rana, new species.

Labial palpi blackish brown exteriorly, ochreous on their inner side. Face, head and thorax light ochreous fuscous. Fore wings whitish ochreous strongly suffused with dark fuscous and with blackish brown ornamentation as follows: A blackish spot on base of costa; an outwardly oblique streak from base of dorsal edge, terminating on the middle of the cell; a small round spot just within the dorsal edge at apical third; a broad outwardly oblique costal streak from just beyond middle of costal edge, terminating at the end of the cell; a small costal spot just before apex. Hind wings ochreous fuscous. Abdomen fuscous. Front legs blackish, posterior legs ochreous sprinkled with black.

Alar expanse, 17–18 mm.

Habitat: Pittsburg, Pa. (H. Engel)

Type: U. S. N. M., No 10224.

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*Trans. Am. Ent. Soc., vol. II., p. 285, 1869.

This strongly marked dark species suggests by its color and general habitus the genus *Hysterosia*, but has the venation typical of the present genus.

Phalonia grandis, new species.

Labial palpi ochreous white, suffused with dark fuscous exteriorly. Face, head and thorax yellowish white. Fore wings yellowish white slightly suffused with deeper ochreous on apical half. Three blackish brown costal spots, one at base, one on the middle, and one at apical fourth. A large dark triangular spot on the middle of the dorsal edge reaches with its tip up into the middle of the cell; this spot is light olivaceous brown with darker fuscous and black scales intermixed. Extreme terminal edge slightly sprinkled with dark slate-colored scales. Cilia white. Hind wings silvery white with dark fuscous short transverse striation nearly equally plain on both sides of the wing. Abdomen ochreous fuscous. Forelegs blackish, posterior legs ochreous.

Alar expanse: 30 mm.

Habitat: Chimney Gulch, Golden, Colorado (Oslar).

Type: U. S. N. M., No. 10225.

This is the largest species of this genus described from Europe or America both in regards alar expanse and width. It approaches in size and color *edwardsiana* Walsingham, but is readily distinguished by the ornamentation of both fore and hind wings.

Phalonia yuccatana, new species.

Labial palpi creamy white, second joint shaded with reddish brown exteriorly. Face, head and thorax yellowish creamy white with a slight rosy tint. Fore wings creamy white with costal edge from base to beyond middle narrowly dark reddish brown and with a similarly colored spot at apical fifth of costa. Both of these markings contain transverse black streaks. On the middle of the dorsal edge is a small, round, blackish spot preceded and followed by a few black striations. On the disc just before the end of the cell are two short, parallel, transverse, blackish brown dashes, sometimes continued into a longitudinal series of small transverse streaks of which, however, only the outer ones near the terminal edge are persistent. Hind wings light fuscous with darker veins and dorsal edge. Abdomen yellowish. Legs creamy yellow. The entire insect has a slight rose tinge.

Alar expanse: 18–20 mm.

Habitat: Nuecestown, Texas (C. L. Marlatt).

Type: U. S. N. M., No. 10226.

Foodplant: *Yucca baccata*.

Bred in the insectary of U. S. Department of Agriculture from pupæ, collected by Mr. C. L. Marlatt, April, 1896, on the above plant, where the larvæ had spun their cocoons in the rolled-up leaflets. A very distinct large species not easily confounded with any described species of this genus.

Phalonia louisiana, new species.

Labial palpi light yellow. Face, head and thorax dark golden yellow. Fore wings light shining straw-colored overlaid with golden yellow, and with the base and two oblique fasciæ dark golden brown. The first of these fasciæ runs from before the middle of the dorsal edge to beyond the middle of costal edge and is the broadest of the two; the second fascia runs between and parallel with the first and the terminal edge. Both are darkest on the dorsal edge, and gradually become lighter and more yellow towards costa. The intervening space is strongly suffused with golden yellow. Apical edge silvery overlaid with golden yellow. Cilia white. Hind wings dark fuscous. Abdomen blackish fuscous. Legs ochreous shaded with black.

Alar expanse: 16 mm.

Habitat: St. Louis, Missouri (Busck).

Type: U. S. N. M., No. 10227.

This species has the same general pattern as *Phalonia parallelana*, Walsingham, but is a larger, more brilliant insect with darker hind wings.

Phalonia pimana, new species.

Labial palpi, head and thorax light ochreous. Fore wings whitish ochreous, suffused with deeper ochreous scales and with reddish brown markings. A complete narrow reddish brown central fascia, parallel with the oblique terminal edge has both edges straight and sharp and is the dominating ornamentation. The base of costal edge is reddish brown, and there is a nearly obsolete small fascia across the extreme apex of the wing, indicated mainly by reddish brown scales at both ends, while the middle part is suffused and obscured by the ochreous scaling. At apical third is a small reddish brown dorsal spot. Hind wings whitish ochreous. Abdomen and legs ochreous.

Alar expanse: 16 mm.

Habitat: Baboquiveria Mts., Pima Co., Arizona.

Type: U. S. N. M., No. 10228.

This species belong near *transversana*, Walsingham.

Phalonia plummeriana, new species.

Labial palpi, face, head and thorax light ochreous. Fore wings light ochreous suffused with reddish brown scales, especially on the apical half, and with an oblique reddish brown fascia from before the middle of the dorsal edge to beyond the middle of the costal edge. This fascia has straight and parallel edges, and is more intensely reddish brown on the dorsal side, gradually losing itself towards costa in the reddish scaling around it. Extreme tip of the wing is reddish brown. Hind wing silvery ochreous white. Abdomen dark ochreous fuscous. Legs whitish ochreous sparsely sprinkled on external surfaces with fuscous.

Alar expanse: 13–14 mm.

Habitat: Plummers Island, Maryland (in the Potomac river above Washington City).

Type: U. S. N. M., No. 10229.

Phalonia schwarziana, new species.

Labial palpi, light yellow, sprinkled with reddish scales on the underside and towards the tip. Face, head and thorax light yellow; scales on patagia tipped with dark fuscous. Fore wings rather broad and square, light greenish yellow with a striking central fascia parallel with terminal edge; this fascia is of a rich reddish brown color on dorsal edge lined with darker brown, but gradually becomes narrower and lighter towards costal edge, where the light ground color in merely darkened by a sprinkling of slate-colored scales; the fascia is edged on both sides by strongly lustrous golden yellow scales. Costal edge at base narrowly darkened by fuscous scales and extreme tip of wing is similarly darkened. Hind wings light fuscous with whitish cilia. Abdomen ochreous. Four anterior legs blackish with white annulations on the tarsi; posterior legs ochreous, slightly sprinkled with fuscous.

Alar expanse: 11 mm.

Habitat: Plummers Island, Maryland (in the Potomac river above Washington City).

Type: U. S. N. M., No. 10230.

The species approaches in pattern *hospes* Walsingham, but the light olivaceous yellow ground color and the definitely limited fascia at once separates it; it belongs besides to the more broad and short-winged group of the genus.

I name this pretty and striking little species after Mr. E. A. Schwarz in pleasant memory of the many long summer evenings and nights spent together with him on Plummers Island in the pursuit of insects attracted to light, when the micros were too numerous to allow sleep, and when Mr. Schwarz could always be counted on to keep the enthusiasm up until the morning.

Phalonia aureana, new species.

Labial palpi, head and thorax fawn-colored. Basal third of the fore wings fawn-colored except along the dark fuscous costal edge; this basal patch is not very sharply limited by a large, dark, blackish fuscous cloud, which covers the entire apical part of the wing except the terminal and apical edges, and which contains light ochreous, reddish and silvery scales especially in its basal part. Apical and terminal edge golden fawn-colored with an oblique narrow silvery streak crossing the tip. Cilia light yellow. Hind wings dark blackish fuscous. Abdomen dark fuscous. Legs ochreous shaded with black.

Alar expanse: 12–13 mm.

Habitat: Oak Station, Pennsylvania (F. Marloff).

Type: U. S. N. M., No. 10231.

Nearest and quite close to *Phalonia hospes* Walsingham, but differing in that the basal light area is broadest on the dorsal side instead of at the costal part as in Lord Walsingham's species.

Phalonia gunniana, new species.

Labial palpi white, shaded with fuscous on the exterior sides. Face light ochreous. Head and thorax whitish ochreous mixed with brown and black scales. Fore wings dark brownish ochreous on the terminal part with a rosy tint; on the middle of the dorsal edge is a large semicircular blackish spot, which is the base of an indistinct transverse light brown fascia, hardly darker than the ground color. Before tornus is a similarly colored large round spot surrounded by silvery and light rose-colored scales. Across the extreme apex of the wings is an oblique black streak and terminal edge and the cilia is dusted with black. Hind wings dark fuscous. Abdomen, dark fuscous. Legs, ochreous shaded externally with black.

Alar expanse: 10–12 mm.

Habitat: Plummers Island, Md. (Busck).

Type: U. S. N. M., No. 10232.

This species is very close to, and when rubbed mistakeable for *Phalonia bunteana* Robinson, but differs by the darker basal part and the more brownish general color.

Phalonia marloffiana, new species.

Labial palpi whitish dusted with fuscous; terminal joint fuscous. Face and head whitish sprinkled with fuscous. Thorax light fuscous. Fore wings white with dark fuscous and black markings and slightly suffused with ochreous near base. Basal third white except the costal edge and a dorsal spot near the base which are dark fuscous. This nearly unmottled basal patch reaches further out on the costal than on the dorsal edge, and is limited by a poorly defined broad central blackish fuscous area, sprinkled with whitish and brownish scales and somewhat incised on the middle of the wing. Beyond this area is a transverse white fascia parallel with the terminal edge and more or less obscured by dark mottling especially towards the dorsal edge. Apical part of the wing black sprinkled with scattered brown and whitish scales. Hind wings dark blackish fuscous. Abdomen dark fuscous above, under side ochreous sprinkled with fuscous. Legs whitish ochreous, sprinkled with fuscous.

Alar expanse: 10–11 mm.

Habitat: Oak Station, Pennsylvania (F. Marloff).

Type: U. S. N. M., No. 10233.

I take pleasure in naming this very distinct species in honor of the collector, from whom I have repeatedly had interesting and carefully mounted Microlepidoptera.

The species has a certain similarity to the European *angustana* Treitsche.

Phalonia lavana, new species.

Labial palpi white, shaded with light fuscous. Face and head dirty white. Thorax light fuscous. Fore wings silvery white, mottled and marked with black and brown. Costal edge is tinged with brown, especially at base and marked with about sixteen equidistant small black streaks from base to apex. On the middle of the wing three of these streaks are combined into a larger spot by intervening dark brown scales, and from the spot is emitted an indistinct, poorly defined brown shade across the wing. Basal third of the wing is nearly unmottled, but the apical part is somewhat darkened by irregular black striation. The apical two-thirds of the dorsal edge is also marked with small black streaks and the tip of the wing is strongly mottled with black and brown scales. Hind wings whitish silvery fuscous. Abdomen dark fuscous. Legs, whitish; anterior tarsal joints annulated with black.

Alar expanse: 12–13 mm.

Habitat: Oak Station, Pennsylvania (F. Marloff); Hyattsville. Maryland (Busck).

Type: U. S. N. M., No. 10234.

Phalonia hubbardana, new species.

Labial palpi smoky white, externally shaded with fuscous. Face smoky, yellowish white. Top of head and thorax yellowish white strongly sprinkled with black. Fore wing smoky white overlaid with light yellow and faintly mottled by transverse black striation; this striation is emphasized on the costal edge, which on account of the many close short streaks appears blackish. Termen and cilia black, each black scale, however, minutely tipped with white. On the middle of the dorsal edge is an outwardly oblique more or less distinct black streak reaching the fold. Hind wings light silvery fuscous. Abdomen and legs whitish fuscous; tarsal joints blackish.

Alar expanse: 12–13 mm.

Habitat: Tucson, Arizona (H. G. Hubbard).

Type: U. S. N. M., No. 10235.

Food plant: *Koeberlinia spinosa.*

The larva of this species is a borer in the stems and thorns of the above plant, and is "bright semitransparent greenish yellow, with head and cervical shield pale brownish." They were received in January, 1897, from Mr. Hubbard by the U. S. Department of Agriculture, and bred by Mr. Pergande in May of the same year. Mr. Hubbard stated in his letter of transmission that the plant never has leaves and that the thorns are poisonous.

The species is nearest *Phalonia campicolana* Walsingham in coloration, but is much smaller and differs by its yellow color, which suffuses the wing, as well as by the absence of the black base and darker costal markings found on the fore wings of Lord Walsingham's species.

Phalonia temerana, new species.

Labial palpi whitish with exterior sides of second joint and the apical joint clear brown. Face, head and thorax whitish, sprinkled with brown. Fore wings white evenly suffused with brown scales; just before the middle of the dorsal edge is an outwardly oblique brown streak edged with black and terminating on the fold, though faintly continued beyond it as a slight dark shade. Apical third of the wing brown sprinkled with sparse black scales. Cilia sprinkled with black. Hind wings dark fuscous. Abdomen ochreous fuscous. Anterior legs blackish; posterior legs whitish ochreous.

Alar expanse: 12–13 mm.

Habitat: Oak Station, Pennsylvania (F. Marloff).

Type: U. S. N. M., No. 10236.

An obscurely marked species recognizable by the clear brown labial palpi and the brownish apical part of the fore wings.

Phalonia leguminana, new species

Labial palpi dark reddish brown exteriorly, sprinkled with white on the inner side. Face and head dark fuscous, sprinkled with white. Anterior part of thorax dark fuscous; posterior part whitish sprinkled with fuscous; posterior tuft dark reddish brown The lustrous white ground-color of the fore wings is for the greater part heavily overlaid with shining dark fuscous, light slate-colored, black and brown scales, a basal patch of mixed dark fuscous, black and brown scales, wider on costal side than on the dorsal, is limited exteriorly by a nearly unmottled oblique white fascia, this spreads out on the costal edge over the central part of the wing, and downwards in a narrow spur to the dorsal edge at apical third, enclosing a large round blotch of dark scales on the middle of the dorsal edge On the costal edge are several small dark spots in the white part Apical third of the wing is entirely overlaid with dark mixed fuscous brown and black scales except for a thin white line across the tip. Hind wings light whitish fuscous with darker tip and veins. The four anterior legs are blackish with white annulations on the tarsi; posterior legs whitish ochreous, slightly sprinkled on the outer surfaces with fuscous.

Alar expanse: 14–15 mm.

Habitat: Washington, D. C.

Type: U. S. N. M., No. 10237.

Food plant: *Gleditschia horrida.*

This species was bred in the insectary of the U. S. Department of Agriculture in February from seedpods of the above plant, collected the previous September; the larvæ fed on the pulp around the seeds. They were dirty greenish, tinged with purple, head brownish yellow, cervical shield lighter, both highly polished; piliferous warts large, flat, polished, about the color of the body.

The species is nearest and quite close to the European *dubitana* Hübner, but differs in the much greater extent of the dark parts of the fore wings and in the presence of the narrow transverse white line across the tip.

Genus **PHARMACIS** Hübner.

Fore wings with vein 7 to termen. Hind wings with 3 and 4 connate or stalked; 6 and 7 stalked.

Type: sartana Hübner.

Synopsis of American species.

Ground color of fore wings white.............................*mexicana.*
Ground color ochreous.................................... 1
1. Entire apical part of wing dark clouded........................ 2
Apical part of wing with limited dark markings................... 3
2. With broad dark dorsal marking touching the edge..........*erigeronana.*
With narrow dark dorsal marking not touching edge..........*deceptana.*
3. With complete central fascia.................................*sartana.*
Without such fascia...*bimaculana.*

Pharmacis deceptana, new species.

Labial palpi whitish, sprinkled with ochreous fuscous. Face, head and thorax dirty white, sprinkled with ochreous fuscous. Fore wings dirty white overlaid with ochreous fuscous and with dark brown markings. The basal two-thirds of the fore wing is evenly sprinkled with short, ill-defined transverse ochreous fuscous streaks, and contains on the middle of the fold a conspicuous dark brown kidney-shaped oblique spot, nearly but not quite touching the dorsal edge: this spot is emphasized by being surrounded by a narrow edge of unmottled white. Beyond the end of the cell is a large, indistinct, round, light brown spot, which is rather sharply defined towards the lighter basal part of the wing, but which apically gradually mixes with the surrounding color and partly covers the entire apical third. Hind wings dark brown with whitish cilia and with under side slightly speckled with white transverse streaks. Abdomen, dark fuscous. Legs, light ochreous.

Alar expanse: 16 mm.

Habitat: Kerrville, Texas (Wm. Barnes).

Type: U. S. N. M., No. 10238.

Near to *bimaculana* Robinson, but larger and with the well-defined apical spot of that species supplanted by the suffused brown shade. This species has a certain general resemblance to Lord Walsingham's figure of *Pœdisca maculatana* and the type specimens were determined by Mr. Wm. Kearfott as that species for the National Museum.

Pharmacis mexicana, new species.

Labial palpi white, slightly sprinkled with light fuscous externally and with apical joint light fuscous. Head and thorax white, slightly suffused with light ochreous fuscous. Fore wings white, slightly suffused with light ochreous fuscous and with brown markings. Basal third evenly and lightly darkened by short indistinct transverse striation; before the middle of the dorsal edge is a large conspicuous dark brown, outwardly oblique streak, terminating beyond the middle of the cell. This streak has parallel and straight edges, and is limited on both sides by a narrow edging of pure white scales. Beyond the end of the cell is a large ill-defined ashy brown shade, limited basally by a line of unmottled white and reaching nearly to the terminal edge; beyond it is a short oblique whitish fascia across the tip of the wing. Extreme apex ashy brown. Cilia white with dark fuscous tips. Hind wings light whitish fuscous on the upper side, faintly showing the ornamentation of the under side, which is whitish with dark fuscous transverse lines. Abdomen and legs ochreous white, slightly dusted with light fuscous.

Alar expanse: 22 mm.

Habitat: Beulah, New Mexico, 8,000 feet altitude (T. D. A. Cockerell).

Type: U. S. N. M., No. 10238.

This is the largest and lightest colored of the described American species of this genus.

Genus **COMMOPHILA** Hubner

Fore wings with vein 7 to costa or apex, 7 and 8 sometimes connate; with raised scales. Hind wings with 6 and 7 approximate, connate or stalked; 3 and 4 connate or stalked.

Synopsis of American species.

	Ground color whitish	1
	Ground color not white	2
1.	Hind wings with strong dark transverse striation	*macrocarpana.*
	Hind wings without such striation	*fuscodorsana.*
2.	Fore wings dark brown	*saxicolana.*
	Fore wings light ochreous	*comes.*

Commophila comes Walsingham.

Conchylis comes Walsingham, Trans. Ent. Soc, London, 1884, p. 129.
Phalonia comes Fernald, Dyar, List N. Am. Lep. No. 5463, 1903.

This species should be referred to the present genus, if Lord Walsinghams determination of my specimen is authentic, as I believe. It has slightly raised, smooth scale tufts on the fore wings and veins 7 and 8 connate to costa; hind wings with 3 and 4 connate, 6 and 7 stalked. The specimen before me was bred in the insectary of the U. S. Department of Agriculture from galls on oak, made by *Olliffiella cristicolæ* Cockerell, received from Mr. H. K. Morrison, Fort Grant, Arizona. The following is Mr. Pergande's note on the larva: "Preying on the Coccid. Head "brick red, body purplish, cervical plate paler anteriorly with a "broad black posterior margin; body marked each side with a "somewhat irregular row of minute whitish spots and similar "spots across the middle of the segments; venter pale dirty "yellowish; length, 7 mm."

Genus **HYSTEROSIA** Stephens.

Fore wings with vein 7 to termen. Hind wings with veins 3 and 4 connate; 6 and 7 approximate but separate at base.

Type: inopiana Haworth.

Synopsis of American species.

	Fore wings creamy white	*ægrana.*
	Fore wings not creamy white	1
1.	Fore wings with ochreous markings	2
	Fore wings with brown or fuscous markings	4
2.	Hind wing whitish	3
	Hind wing fuscous	*inopiana.*
3.	Fore wings suffused with light golden yellow	*aureoalbida.*
	Fore wings blotched with darker yellow scaling	*fulviplicana.*

4. Head dark fuscous 5
   Head ochreous 6
5. Fore wings with a violet tint .... *birdana.*
   Fore wings without such tint .... *modestana*
6. The light ground color prevailing .... *villana.*
   The dark fuscous scaling prevailing 7
7. Fore wings with deep ochreous markings on fold .... *baracana.*
   Fore wings without such markings .... *terminana.*

Hysterosia birdana, new species.

Labial palpi blackish brown. Head dark brown intermixed with ochreous Thorax dark purplish brown with a posterior tuft. Fore wings dark violet brown with still darker purplish brown markings as follows: a costal spot at base; another before the middle of the wing, which emits a narrow inwardly oblique fascia, which gradually widens until it reaches the dorsal edge at basal third. A round dark spot within the dorsal edge at apical third and the entire tip of the wing limited inwardly by a straight line running from tornus to apical third of costal edge. At the end of the cell is a small round black dot. Hind wings above light ochreous fuscous with the ornamentation of the under side faintly showing through; under side whitish with numerous, undulating, transverse, dark fuscous lines running across the wing. Abdomen ochreous fuscous. Legs ochreous, shaded externally with black.

Alar expanse: 27 mm.

Habitat: Rye, New York (H. Bird).

Type: U. S. N. M., No. 10240.

Food plant: *Helianthus*.

Bred by Mr. H. Bird from larvae boring in the roots of *Helianthus*, occurring with those of *Papaipema nelita* Strecker.

This fine species, which I take pleasure in naming in honor of the discoverer, is by far the largest and darkest of the genus, and can not be mistaken for any of the other described species, though partaking in the general common scheme of markings.

Hysterosia modestana, new species.

Labial palpi dark fuscous with inner surfaces ochreous. Face, head and thorax dark fuscous; thorax smooth. Fore wings uniformly dark fuscous with a strong silky lustre; at the end of the cell outside of the usual small black dot is a small transverse blackish spot and between this and the apex is another larger blackish spot. Hind wings dark ochreous fuscous above; under side whitish fuscous checkered with dark fuscous transverse striation. Abdomen, dark fuscous. Anterior legs black with ochreous annulations on tarsal joints; posterior legs ochreous, mottled with black.

Alar expanse: 20 mm.

Habitat: Pittsburg, Pennsylvania (H. Engel).

Type: U. S. N. M., No. 10241.

The uniform dark color and the strong silky lustre, together with the dark head easily separates this species from the others here defined.

Hysterosia terminana, new species.

Labial palpi yellowish white, slightly shaded with black on the exterior side of second joint. Face ochreous white. Head, ochreous intermixed with fuscous. Thorax smooth, ochreous fuscous. Fore wings whitish ochreous, irregularly overlaid with dark fuscous spots and blotches. Costal fold dark fuscous. At the end of the cell is a small blackish dot, followed by a transverse, elongate triangular, dark fuscous shade; between this and the dark apical part of the wing is a nearly unmottled, narrow fasci-form, ochreous white space, limiting sharply the dark apical part, which is darkest towards the base of the wing and gradually becomes lighter towards the tip. Upper side of the hind wings light whitish fuscous with the ornamentation of the under side faintly showing through; under side ochreous white, slightly mottled with light fuscous, transverse striation. Abdomen and legs ochreous.

Alar expanse: 17–20 mm.

Habitat: Pittsburg, Pennsylvania (H. Engel).

Type: U. S. N. M., No. 10242.

Nearest the following species from which it differs by the lighter head and palpi and by the absence of deep ochreous markings on the fold.

Hysterosia baracana, new species.

Labial palpi ochreous, shaded externally with black. Face and head ochreous brown, the face rather darker than the top of the head. Thorax dark fuscous with small ochreous posterior tuft. Fore wings with the ochreous white ground color, nearly completely obscured by dark fuscous black and deep ochreous scales. Costal edge blackish with three pairs of small indistinct ochreous streaks on the outer half. At the end of the cell is a small round black dot, surrounded by light ochreous scales; beyond it is faintly indicated the usual small transverse dark shade, followed by a blackish streak across the tip of the wing. On the disc and along the fold are several small ill-defined deep ochreous spots and single scales of the same color are sprinkled on the dorsal part of the wing below the fold. Hind wings light fuscous above and below with merely a trace of darker striation on the under side. Abdomen dark fuscous with ochreous anal tuft. Anterior legs blackish; posterior legs ochreous with blackish spurs.

Alar expanse: 16–17 mm.

Habitat: St. Louis, Missouri (McElhose, Busck).

Type: U. S. N. M., No. 10243.

The tufted thorax and the ochreous markings on the fold of the fore wings distinguish this species from its allies.

Hysterosia villana, new species.

Labial palpi ochreous with under side and tip black. Face, head and thorax ochreous. Fore wings clear straw-yellow with blackish fuscous markings and slightly suffused in irregular spots with deeper ochreous. Base of costa blackish. A basal patch of unmottled yellow reaches further out on the costal edge than on the dorsal edge, and is limited by a large ill-defined dark suffused patch, running obliquely across the wing, though not reaching the costal edge. Beyond this central patch is a narrow, nearly unmottled light space across the wing, limiting the dark mottled apical part of the wing in an inwardly angulated line from tornus to apical third of costal edge. At the end of the cell is a blackish dot, connected with dark apical part by some dark fuscous scales. Hind wings light silvery fuscous on the upper side; under side slightly mottled with dark transverse striation. Abdomen and legs ochreous.

Alar expanse: 19–21 mm.

Habitat: Denver, Colorado (Oslar).

Type: U. S. N. M., No. 10244.

This species approaches in color *aureoalbida*, Walsingham, but belongs rather together with the dark species described in the present paper.

Hysterosia inopiana Haworth.

There is in the U. S. National Museum a single specimen collected in California by Lord Walsingham, and determined as this species by him. From the comparison of this specimen with European specimens I am unwilling to pronounce on their identity but I am incined to regard the record from this country as doubtful.

Genus **CARPOSINA** Herrich-Schaffer.

This remarkable genus was defined, naturally rather incompletely, as a Tineid genus by Herrich-Schaffer in his "Syst. Bear. der Schmetterlinge von Europa," vol. v., p. 38, 1853, and has not, as far as I am aware, been adequately characterized in print since. It has the following characters: Labial palpi in the female very long, straight, porrected; second joint thickened with short brushes above and below, terminal joint rather long, plainly visible beyond the hairs of the second joint; in the male the palpi are much shorter and strongly upward curved, second joint with thick short brush above and beneath, terminal joint short, erect and clothed with scales, so as to appear as broad as long and nearly square. Antennæ in the female simple, shortly ciliate; in the male with enlarged basal joint and long (2–3) ciliation. Ocelli obsolete. Thorax smooth. Fore wings narrow, elongate; apex pointed; termen very oblique; with raised scale tufts; 12 veins, all separate; 2, 3, 4 and 5 approximate from lower corner of cell; 7 to termen. Hind wings broader than the fore wing, with well developed pecten on lower median vein; costa nearly straight; termen strongly oblique, straight or subsinuate; dorsal edge rounded; 6 veins; veins 4 and 6 obsolete (coincident with 3 and 7); 3 and 5 approximate or connate; 7 to apex. Posterior tibiæ hairy.

The known larvae of this genus feed in the seeds of fruits and pupate in the ground in a cocoon, made of silk and particles of earth. The Japanese species *Carposina sasaki* Matsumura* is an important enemy of the peach crop of the country†.

The genus belongs to a very abnormal group of the subfamily *Phaloniinæ* together with one Japanese genus *Propedesis* Walsingham‡ and three Australian genera *Paramorpha* Meyrick, *Oïstophora* Meyrick, and *Coscinoptycha* Meyrick.§ all having the characteristic reduction of veins in the hind wings and all with a peculiar general habitus abnormal within the family, due to their narrow, tufted fore wings and the unusual palpi.

The group might with propriety be given separate subfamily rank, with the reduction of the number of veins and the hairy lower median vein as distinctive characters.

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*Entom. Nachricht. XXVI, p. 198, 1900.

†This is the *Carpocapsa persicae* Sasaki, mentioned in "Insect Life" (vol. II, pp. 24, 65; IV, p. 341). This species, of which specimens from Prof. Sasaki are in the National Museum, appears to be quite variable and I would suggest the probability of its identity with *Carposina niponensis* Walsingham (Ann. and Mag. N. H. VI, p. 121, 1900).

‡Ann. and Mag. N. H. VI., p. 122, 1900.

§Proc. Linn. Soc. N. S. Wales, VI., p. 693, 1881.

Meyrick's interpretation of the venation of his Australian genera is very singular and I venture to believe that he would now analyze it otherwise and in conformity with the above.

One of the American species, *Carposina crescentella* Walsingham, has veins 3 and 5 separate in the hind wings, while the type of the genus and the other known species have these veins connate; but the characters are in all other respects identical and I do not believe the difference is of more than specific value in this group.

The two American species at present named may be separated thus:

With white dark-margined crescent-shaped mark at end of cell. . *crescentella*
Without such mark; wings much broader . . . . *fernaldana*

Carposina crescentella Walsingham.

Carposina crescentella, Walsingham, Trans. Am. Ent. Soc., x., p. 189, 1882; Dyar, List. N. Am. Lep., No. 5475, 1903.

In U. S. National Museum are specimens of this easily recognized species from New Brighton, Pa. (Merrick) and from Ottawa, Canada (C. H. Young).

Carposina fernaldana, new species.

Labial palpi in the male blackish with inner side and tip of terminal joint dirty white; in the female they are black with upper tuft on second joint and tip of terminal joint dirty white. Face, head and thorax whitish, sprinkled with light fuscous. Fore wings whitish, liberally sprinkled with light ochreous fuscous; basal third of costal edge black, followed by equidistant, rather ill-defined, black spots on the entire costal edge and around apex to tornus. Reaching from the middle of costal edge to apical third is a black, more or less interrupted, crescent-formed marking, the most persistent part of which is two short longitudinal black lines just above the cell ending in a scale tuft; other tufts of raised scales are found on the middle of the cell, just below the end of the cell and below the fold. Hind wings whitish fuscous; abdomen, light fuscous. Legs, black exteriorly, shining ochreous white on the inner side; tarsal joints with indistinct darker annulations.

Alar expanse: 15–20 mm. (the males being the larger).

Habitat: Plummers Island, Maryland (Busck); Oak Station, Pa. (Marhoff); New Brighton, Pa. (Merrick); St. Louis, Mo. (McElhose, Busck); Chicago, Ill. (Kwiat).

Type: ♂ and ♀ U. S. N. M. No. 10245.

I take pleasure in naming this very distinct and pretty species in honor of the American authority in this family, my esteemed friend, Professor C. H. Fernald.

THE BUTTERFLIES OF THE SAN BERNARDINO MOUNTAINS, CALIFORNIA.

By JOSEPH GRINNELL AND FORDYCE GRINNELL, JR.,

PASADENA, CALIF.

Three summer months in 1905 and two in 1906 were spent by the senior author in natural history field-work in the San Bernardino Mountains, California. Although attention was paid more particularly to vertebrates, many insects were obtained, and of these nearly 1000 Lepidoptera were secured, representative of the 51 species of butterflies enumerated in the present paper, besides a number of moths. The majority were taken about the head of the Santa Ana River, at elevations ranging from 5,000 to 8,500 feet.

During the season of 1906 Hilda Wood Grinnell was most active with the net, and several of the rarities were discovered through her continued watchfulness. Although we were not inclined to collect vast series (in fact our time had to be apportioned among several subjects), yet we were always on the lookout for things not previously collected.

We were especially interested in noting the zonal ranges of certain butterflies which seemed to be as sharply limited as some birds and mammals. And, as with the latter, certain other butterflies seemed to be spread broadcast, indifferently. But here it must be kept in mind that while imagines may range extensively, vertically as well as horizontally, the larvæ may feed exclusively on certain plants which are of very limited range. As with birds, it is the *breeding* range we should try to determine, though this is most difficult.

The life zones represented on the San Bernardino Mountains within the region worked include the Upper Austral, Lower Transition, Upper Transition, Canadian and Hudsonian. Each of these possesses many restricted and characteristic plants and animals. Naturally the former are most serviceable as earmarks.

The Upper Austral, which completely encircles this mountain group, the higher zones being arranged more or less concentrically within, is represented on the two slopes by remarkably different divisions or faunæ. It is characterized on the Pacific side by the scrub oak (*Quercus dumosa*), grease-wood (*Adenostoma fasciculatum*), and several species of manzanita and *Ceanothus;* and on the desert side by the pinyon (*Pinus monophylla*) and sage (*Artemisia tridentata*), the latter also running up into Transition in places. (Of course there are many other good zone plants besides those mentioned here.) As is the case with the other zones, the Upper Austral is very variable in altitudinal extent, this being dependent upon slope exposure, air-currents and other factors. For further information along this line of investigation, we would refer the enquirer to an excellent paper by H. M. Hall, entitled "A Botanical Survey of San Jacinto Mountain" (Univ. of Calif. Pub.; Botany, Vol. I; pp. 1–140, Pls. 1–14; June, 1902).

The Lower Transition is the most extensive of the zones, covering a large very irregular area which interdigitates with the Upper Austral below, and merges above into the Upper Transition — wherever the latter occurs. It is the chief timber belt of the mountains and is occupied by the more or less open forests of yellow and Jeffrey pines (*Pinus ponderosa* and *P. jeffreyi*), incense cedar (*Libocedrus decurrens*), and golden and black oaks (*Quercus chrysolepis* and *Q. alifornica*).

The Upper Transition zone is chiefly recognizable by the prevailing presence of the white fir (*Abies concolor lowiana*), a buckthorn (*Ceanothus cordulatus*) and a manzanita (*Arctostaphylos patula*). From the Transition the Canadian zone is usually very abruptly marked off. One passes, within a few hundred feet, from the tall firs and pines of the former into the timber of lesser stature composed entirely of the tamarack or Murray pine (*Pinus murrayana*). The underbrush of the Canadian, where there is any, consists of the chinquapin (*Castanopsis sempervirens*), while one notices among flowers *Pentstemon cæsius*) as peculiar.

Above, the Canadian tamaracks become replaced more gradually by the more or less stunted limber pines (*Pinus flexilis*) characteristic of the Hudsonian zone, where we also found exclusively certain flowers, such as *Spraguea umbellata*, *Bryanthus breweri* and *Ranunculus eschscholtzi*. This zone is the most restricted one, occurring only along the crest of the lofty range just south of the upper Santa Ana and marked at the west end by San Bernardino Peak (10,060 feet) and at the east end by San Gorgonio Peak, the highest mountain of southern California (11,485 feet).

Butterflies were observed in the Hudsonian zone, but we found no species there that we failed to find lower. In the Canadian zone the Murray pine woods were almost destitute of day-flying Lepidoptera, but the grassy cienegas, such as those at the headwaters of the South Fork of the Santa Ana, were well populated. Here, at an altitude of 8,000 to 9,000 feet, flying over the brilliantly green meadows dotted with lilac-colored shooting-stars (*Dodecatheon alpinum*) and white violets (*Viola blanda*) were found large numbers of the newly-named *Cupido hilda*. This blue seemed to be characteristic of the Canadian zone, and even though the mornings of the last week in June, 1905, when we were camped at one of the upper cienegas, were to us unpleasantly frosty, an hour or two's sunshine brought them out in swarms. We found this species also down well into Transition along cool canyon beds, but only sparingly. A number of lower-zone butterflies also flew about these Canadian cienegas, such as *Euvanessa antiopa*, *Aglaïs milberti* and *Lemonias augusta*.

In Upper Transition, by far the most abundant species of butterfly, and one invading but rarely above or below, was the San Bernardino checker, *Lemonias augusta*. This species was abundant in June (especially of 1905) about the blossoming buckthorn bushes.

In the Lower Transition, where, because of its great area, we spent most of our time, a great many butterflies were met with that were not seen elsewhere, and *may* have been exclusive inhabitants of this zone. But here we are unusually liable to error, in making too general statements as to distribution; for the Upper Austral was not as thoroughly worked, and may have yielded many of the same species. We will, therefore, in the list beyond offer whatever distributional data we took in more or less detail, leaving generalizations until the surrounding country has been more thoroughly surveyed.

We must emphasize the extreme value in systematic lepidopterology of recording *exact locality*, just as in the study of birds or mammals or any other group of living things. The greater portion of our literature on west American butterflies is sadly neglectful of this principle. Such locality-assignments as "California," "southern California," "interior valleys," or even "the San Bernardino Mountains," are almost meaningless, and should be avoided as the plague where anything better can be offered — and a specimen, the exact locality of which is unknown, should not be mentioned in print, at least from a zoo-geographic standpoint! Especially should a species never be described without a statement of the *precise* type locality. For the habitat of a species is responsible for its characters, and the more minute the distinguishing features, the more necessary is a knowledge of locality-conditions and range.

1. Papilio rutulus Boisduval.

This was a plentiful species in the well-watered canyons of the Pacific slope of the mountains below 6,000 feet altitude. It was noted in Mill Creek and Mountain Home Canyons in June, and all along the Santa Ana up to within a mile of Big Meadows, 6,700 feet, from June 10 to August 5. The following examples were preserved: Fish Creek, at its confluence with the Santa Ana, 6,500 feet altitude, June 20, 1 ♂, June 26, 1 ♂, July 3, 1 ♀, 2 ♂♂, July 5, 1 ♀; near juncture of South Fork with Santa Ana, 6,200 feet, July 2, 2 ♂♂; Seven Oaks, 5,100 feet, July 7, 1 ♂.

2. Papilio zolicaon Boisduval.

This seemed to be a rare swallow-tail in the region worked, for only one example was encountered. This was on the Santa Ana at about 6,100 feet elevation, August 4, 1906.

3. Papilio asterioides Reakirt.

This almost black swallow-tail proved to be most common in the Lower Transition sage belt along the upper Santa Ana, above 6,000 feet. It is a strong flyer and wandering individuals were met with up through the black oak belt towards San Gorgonio Peak. One was even seen flying over the triangulation station on the very summit of San Bernardino Peak, 10,060 feet, July 12, 1905.

This species, often supposed to be identical with *indra* of Reakirt, is unquestionably distinct. It has been correctly described and figured in Wright's recent book, only the specimens figured there are poor and not quite representative of the average characters of the species. The ♂ of *asterioides* approaches *pergamus* quite closely. The female seems to be very variable, one example approaching uniform blackness. Specimens taken: Santa Ana Canyon, 6,100 feet, July 25, 1 ♀, 6,500 feet, July 27, 1 ♀; South Fork Santa Ana, 6,200 feet, July 26, 1 ♀; Lost Creek, 6,400 feet, July 31, 1 ♀; Fish Creek, 6,500 feet, June 20, 2 ♀♀, 1 ♂; same, 6,700 feet, June 11, 1 ♂.

4. Pontia occidentalis (Reakirt) Scudder.

One example from Seven Oaks, 5,100 feet, July 7, 1905, ♂.

5. Pontia protodice (Boisduval & Le Conte) Scudder.

A fairly common species along the hotter north side of the Santa

Ana in the Upper Austral and Lower Transition zones. Noted from Seven Oaks, 5,100 feet, nearly to Big Meadows, 6,700 feet. Two specimens: Santa Ana, opposite mouth of Fish Creek, 6,500 feet, June 19, ♂, July 5, ♀.

6. Pontia rapæ (Linnæus) Scudder.

One example — Santa Ana near mouth of Fish Creek, July 5, ♀.

7. Nathalis iole Boisduval.

This was a common species in warm open stretches along the upper Santa Ana. It was not seen outside of the belt of sage (*Artemisia tridentata*) among the clumps of which it was difficult to see when in flight. It seems to be a local butterfly everywhere, and somewhat erratic in times of appearance. Examples obtained: Santa Ana, opposite mouth of South Fork, 6,200 feet, July 2, 1 ♂; Santa Ana, opposite mouth of Fish Creek, 6,500 feet, June 20, 22 and 26, 3 ♂♂; same, July 5, 2 ♂♂; Fish Creek, 7,000 feet, June 17, 1 ♂.

8. Callidryas eubule (Linnæus) Boisduval & Le Conte.

Detected but once — a ♂ taken on the Santa Ana near the mouth of Fish Creek, 6,500 feet, June 23, 1905. It is rather surprising to find this species at such an altitude; for it is ordinarily noted chiefly around parks and gardens in the thickly settled and cultivated valleys of southern California.

9. Synchloë sara (Boisduval) Scudder.

One specimen — Fish Creek, 6,500 feet, June 19, ♂.

10. Zerene eurydice (Boisduval) Scudder.

This was a common and conspicuous species about the head of the Santa Ana, ranging up through Upper Transition. A shrub growing abundantly in the black oak belt (*Amorpha californica*) was particularly attractive to the ♀♀; while the ♂♂ congregated on clover patches and wet sand along the streams, sometimes as many as five alighted or fluttering close together. Two of the ♀♀ secured are of the so-called "variety *amorphæ*" which is very obviously but an individual variant of *eurydice*. Twelve specimens: Fish Creek, 6,500 feet, July 5, 10 and 23, 1 ♂, 3 ♀♀; same, 7,000 feet, June 30, 2 ♀♀; South Fork, Santa Ana, 6,200 feet, July 2, 2 ♂♂; same, 6,400 feet, July 20, 2 ♀♀; same, 7,500 feet, 1 ♀; Seven Oaks, 5,100 feet, June 27, 1 ♀.

11. Eurymus eurytheme (Boisduval) Scudder.

A common species on cienegas and in open woods up through

Transition. The last of July large numbers appeared about a flowering pennyroyal (*Monardella lanceolata*), and many were migrating up the Santa Ana low among the brush clumps. Series secured: Fish Creek, 6,500 feet, June 23 and 30, 3 ♀♀; same July 5, 1 ♂; Lost Creek, 6,400 feet, July 31, 1 ♀ (an albino); South Fork Santa Ana, 6,200 feet, July 2, 1 ♂, 1 ♀; south slope Sugarloaf, 6,700 feet, July 22, 2 ♂♂; Seven Oaks, July 7 and 9, 3 ♂♂; Bluff Lake, 6,500 feet, July 17, 21 and 28, 3 ♀♀.

12. **Eurema nicippe (Cramer) Hübner.**

Several examples of this species were seen along the Santa Ana in the vicinity of Seven Oaks early in July, when a ♂ was taken on the 7th at about 5,000 feet altitude.

13. **Argynnis semiramis Edwards.**

Perhaps the most abundantly represented species of the region. Its center of abundance was plainly the Lower Transition zone where it began to be common the last week of June. By July 20 most individuals were faded and battered, this process being no doubt helped along by the frequent thunder-showers often accompanied by sleet or hail. This butterfly was very active on warm days, and could only be caught with ease when feeding on its chosen flowers. These included the thistle (*Carduus bernardinus*), yerba santa (*Eriodictyon trichocalyx*) and pennyroyal (*Monardella lanceolata*). As somewhere in the San Bernardino Mountains was the type-locality of *Argynnis semiramis*, we secured specimens whenever opportunity afforded, with the following results: Seven Oaks, 5,100 feet, July 7, 2 ♂♂; South Fork Santa Ana, 6,200–6,400 feet, June 30–July 25, 14 ♂♂; Fish Creek, 7,000 feet, June 30, 5 ♂♂, 3 ♀♀; Santa Ana, 6,500 feet, July 25, 1 ♂, 1 ♀.

14. **Lemonias augusta (Edwards) Dyar.**

This very distinct but local species proved very numerous, especially in June, 1905, in the Upper Transition zone, where the blossoming buckthorn (*Ceanothus cordulatus*) constituted the chief attraction. Fresh, bright individuals began to appear in numbers by June 15 and by the last of the same month most examples looked pretty well battered. The series secured shows remarkable constancy of characters making this species one of the best-marked of the genus. Although in our experience chiefly confined to Upper Transition, yet suitable attractions brought individuals somewhat higher or lower, at least temporarily. For instance near the summit of San Bernardino Peak, 10,000 feet, July 12, 1905, several were flying about a flower growing profusely close to the ground in sunny places (*Spraguea umbellata*). Twenty-nine specimens saved: South Fork Santa Aan, 7,500–8,500 feet, June 27 and 28, 22 ♂♂, 3 ♀♀; Fish Creek 6,500 feet, June 15 and 19, 2 ♂♂; Lost Creek, 6,300 feet, June 30, 1 ♂; Santa Ana, 6,200 feet, July 1, 1 ♀.

15. Phyciodes mylitta Edwards.

Noted but sparingly: Seven Oaks, 5,100 feet, July 7, 1 ♂; South Fork Santa Ana, 6,200 feet, July 2, 1 ♂, 1 ♀; Bluff Lake, 7,500 feet, July 18, 1 ♂.

16. Polygonia satyrus (Edwards) Scudder.

A few seen about nettle patches in the shade of the alders along the Santa Ana in the vicinity of Seven Oaks, 5,100 feet, where a ♀ was obtained July 7, 1905.

17. Eugonia californica (Boisduval) Scudder.

Two or three examples were seen around a cienega at 8,500 feet elevation near the head of the South Fork of the Santa Ana. One example, a ♀, was secured June 28, 1905.

18. Aglais milberti (Godart) Scudder.

One specimen: South Fork Santa Ana, 8,500 feet, June 29, ♂.

19. Euvanessa antiopa (Linnæus) Scudder.

Met with frequently along canyons and about clumps of rank herbage on mountain sides almost irrespective of altitude. Fish Creek, 6,500 feet, June 19 and 20, 3 ♂♂; cienega near head of South Fork Santa Ana, 8,000 feet, June 28, 2 ♂♂.

20. Vanessa huntera (Fabricius) Hübner.

This species suddenly appeared about the 20th of July, 1906, along the Upper Santa Ana, 6,200–6,700 feet. Specimens were bright and unworn, doubtless bred in the near vicinity. A ♂ was taken on July 22 and a ♀ on the 25th.

21. Vanessa cardui (Linnæus) Ochsenheimer.

Fairly common along the Santa Ana up through Lower Transition, but, interestingly enough, not far away from the white-flowered yerba santa (*Eriodictyon trichocalyx*). Three males secured: South Fork Santa Ana, 6,700 feet, July 25; south slope of Sugarloaf, 6,700 feet, July 22; Santa Ana, 6,500 feet, July 25.

22. Vanessa carye (Hübner) Hübner.

Seen only in the vicinity of Seven Oaks, 5,100 feet, where a few frequented the open places about the buildings.

23. **Junonia cœnia Hübner.**

This species, like *Euvanessa antiopa*, ranged almost everywhere, though, unlike the latter, preferring dry open intervals between bushes or tree-clumps. It was seen over on the desert slopes of the mountains (Doble, Cactus Flat, etc.), as well as on the Pacific side where the following specimens were taken: Fish Creek, 6,500 feet, June 19–July 5, 4 ♂♂, 3 ♀♀; South Fork Santa Ana, 6,200–8,500 feet, June 28–July 20, 4 ♂♂, 1 ♀; Seven Oaks, July 7, 3 ♂♂.

24. **Basilarchia lorquini (Boisduval) Scudder.**

One specimen: Fish Creek, 6,600 feet, June 29, 1906, ♂.

25. **Limenitis californica (Butler) Edwards.**

This handsome butterfly was seldom seen away from the golden oak (*Quercus chrysolepis*). None were seen above Lower Transition. It was a common species in the vicinity of Seven Oaks, 5,100 feet, and below. Two examples, both ♂♂, were secured on the upper Santa Ana, 6,200 feet, July 1; and two ♂♂ and ♀♀, brand new, in perfect condition were taken July 22 in a tongue of golden oaks which extend up across the south face of Sugarloaf, 6,700–7,500 feet.

26. **Cercyonis paulus (Edwards) Dyar.**

This identification for the "satyrids" obtained in the San Bernardino mountains is not satisfactory. The group needs thorough overhauling, with large series from numerous localities to work from. The species, whatever name it should bear, proved to be abundant in the Lower Transition zone, especially in this belt of black oaks (*Quercus californica*) which extends over the gentle slope on the south side of the upper Santa Ana. It was not noted above the belt, but was seen down into the upper Austral scrub-oak belt north of Seven Oaks, 5,100 feet. Although the flight of this butterfly is the usual slow, languid perambulation so characteristic of the family we found it often surprisingly difficult to capture, possibly because we failed to put the same dexterity and energy into its pursuit that we devoted to the more swift and agile species. *Cercyonis* seems to ignore the presence of any sort of flowers, and affects dry leaf-strewn ground under bushes, and trees. Out of 25 specimens there was but one ♀: South Fork, Santa Ana, 6,200–6,500 feet, July 1–26, 22 ♂♂, 1 ♀; Fish Creek, 6,500 feet, July 5, 1 ♂; Santa Ana, 6,100 feet, July 20, 1 ♂; south slope Sugarloaf, 6,700 feet, July 22, 1 ♂.

27. **Anosia plexippus (Linnæus) Scudder.**

None taken, but seen several times in July, 1906, along the Santa

Ana at Seven Oaks, 5,100 feet, and up to 6,200 feet, near the mouth of the South Fork.

28. Anosia strigosa (Bates) Scudder.

This species was seen about thistles at Seven Oaks, 5,100 feet, the first week in July. At Cushenbury Springs, 4,000 feet, on the desert edge of the mountains, a pair in copulation was secured on August 10, 1905.

29. Chrysobia virgulti (Behr) Scudder.

But one specimen: ♂, Fish Creek, 6,500 feet, June 20, 1905.

30. Atlides halesus (Cramer) Hübner.

This gorgeous species of "*Thecla*" was encountered but once, August 14, 1905, on the desert side of the mountains. It was along the road leading up the steep, rocky canyon from Cushenbury Springs to Cactus Flat, at about 5,500 feet altitude. The day was particularly hot and glary, even for this semi-desert region. Several examples of *Altides* were seen along the road, alighting on Chrysothamnus bushes or flying among the dwarfed golden oaks. One perfect ♂ was captured with a hat.

31. Uranotes melinus (Hübner) Scudder.

This species was found in brushy places up through Lower Transition, and proved to be the commonest "theclid" of the region. Fish Creek, 6,500–7,000 feet, June 30–July 5, 4 ♂♂, 1 ♀; South Fork Santa Ana, 6,200–7,000 feet, June 27–July 2, 3 ♂♂; hillside near confluence of Bear Creek and Santa Ana, about 4,500 feet, one example, June 12.

32. Thecla dryope Edwards.

One specimen: ♀, South Fork Santa Ana (at mouth), 6,200 feet, July 2, 1906.

33. Thecla spinetorum Boisduval.

But two examples of this rare species were secured, both near the mouth of the South Fork of the Santa Ana: a ♂ July 2, 1906, at 6,200 feet, and a ♀ July 20, 1906, at 6,400 feet altitude. There seems to be some confusion in regard to this species. The examples figured as this species in Wright's book are different from ours and are with much probability the *Thecla johnsoni* Skinner, described from Washington. Mr. Herr took specimens of *spinetorum*, or something like it, on the desert side of San Jacinto Mountain several years ago.

34. Incisalia eryphon (Boisduval) Scudder.

One specimen: ♂, Fish Creek, 6,500 feet, June 22, 1906; caught on patch of clover (*Trifolium wormskjoldi*) at the margin of the stream. This species has been previously found on the central Sierras in the vicinity of Lake Tahoe and the Yosemite Valley. If this is a Transition or Boreal species the present station would indicate a very interesting case of interrupted distribution. Specimens from the two regions have not been compared, so there may be slight differences as the result of the isolation afforded. We are under the impression that Mr. Herr obtained this or a closely similar species on San Jacinto Peak several years ago. The San Bernardino and San Jacinto mountains are only about fifteen miles apart in an air line, but the deep San Gorgonio Pass of Lower Austral zone lies between, which would seem to be a pretty effectual barrier to small butterflies. Extremely interesting results await the careful investigation of all these mountain groups.

35. **Epidemia helloides (Boisduval) Scudder.**

Coppers were rare in the region, and specimens were taken only at the margin of the Santa Ana, at the confluence of Fish Creek with it, 6,500 feet. Here 5 males were secured June 20–22, 1905.

36. **Cupido fulla (Edwards) Scudder.**

A fairly common species, often flying about a lupine (*Lupinus albicaulus*), as well as wet sandy stream-margins. Fish Creek, 6,500–6,700 feet, June 13–30, 3 ♀♀, 3 ♂♂; South Fork, Santa Ana, 6,200–6,700 feet, July 1 and 2, 4 ♂♂, 2 ♀♀; cienega at head of South Fork, 8,500 feet, June 28, 1 ♂.

37. **Cupido hilda, new species.**

MALE. — Expands 25–28 mm. Upper sides of primaries bright blue with a very wide black marginal border, becoming much broader towards the costal edge, where it occupies about half the distance from apex to discal spot; discal spot reniform, black. Secondaries almost entirely blue above, except for a narrower marginal black border, with a few black spots in anal angle. On the under sides the markings of the primaries are very heavy and pronounced: general color ashy gray; a black discal spot large and conspicuous, as are the other spots; next a row of round spots, forming an angled semicircle around the discal spot; at the end of this series are two small black spots placed close together and at right angles to the series; next a row of less distinct spots curved towards the costa and with two small spots on the inner margin at the end of the series; next a series of obscure patches forming a broken line; a narrow fimbriate marginal line. Secondaries below with very pronounced spots occupying nearly the same relative positions as those of the primaries, except that the inner three of the middle row enclose red spots and are sagittal in shape. Fringes of all wings white. Body grayish white.

FEMALE. — Expands 25–32 mm. Upper sides of primaries blackish brown varying to red brown; on the outer half of the wing a bright band of red fading ou betfore it reaches the costa and separated from the outer margin by an equal space of the ground color. On the hind wings there is a similar disposition of markings, except that the bright red band is broader and is separated from the outer margin by a narrower area of the ground color; two black dots in the angle more or less invade the red; this band does not quite reach the costa or inner margin. Under sides in color grayish brown; spots very pronounced and more or less transversely elongated; two heavy round spots between discal point and base; the arrangement is otherwise the same as in the male. Body grayish brown inclining to blackish. Fringes grayish brown.

This species is readily distinguishable from *Cupido dædalus* Behr and other described forms by the bright red bands of the upper sides (in the ♀) which make a decided contrast with the ground color. In an occasional specimen the ground of forewings is reddish and so tends to obliterate the red band; but in our considerable series this is an exception. The heavy spots of both sexes are also characteristic, as is also the deep brown, inclining to reddish, of the females.

This is the same thing that is figured in Wright's "Butterflies of the West Coast" as *dædalus*, but *hilda* is easily separable from *dædalus* by the characters just indicated. The two specimens figured by Wright seem to be extremes or else the color-photography has not succeeded in showing well the contrast between ground color and band.

The group to which *Cupido hilda* belongs is subject to great variation geographically, and has been neglected unduly. Large series of specimens from all over the country will be required for a proper study of the group.

Types of the new species above described are retained in the Grinnell collection. Topotypes will be deposited in the U. S. National Museum. The type-locality is the upper cienega at the head of the South Fork of the Santa Ana, at an elevation of about 8,500 feet (according to the San Gorgonio Quadrangle Topographic Sheet, U. S. G. S.). Here the species was numerous the last of June over the cold Canadian meadows, appearing in the forenoons after the sunshine had dispelled the frost. Although taken at lower elevations, the species was nowhere else so well represented. Our series includes the following examples: Cienega at head of South Fork of Santa Ana, 8,500 feet, June 27 and 28, 1905, 7 ♂♂, 29 ♀♀; South Fork, 6,200 feet, June 28–July 7, 1906, 12 ♂♂, 5 ♀♀; Fish Creek, 6,500 feet, June 22, 1905, 3 ♂♂, 1 ♀; Santa Ana, 5,800 feet, July 20, 1906, 1 ♀.

38. **Rusticus enoptes (Boisduval) Scudder.**

Three examples: ♂♂, Fish Creek, 6,500 feet, June 23, 1905. These specimens agree with the figure in Wright's recent book, and are no doubt distinct from *acmon* and other species, but we are quite sure true *enoptes* is a different thing. The problem remains to be worked out.

39. **Rusticus acmon (Doubleday & Hewiston) Scudder.**

A fairly common species widely distributed, as follows: Santa Ana, 6,200–6,500 feet, June 19–July 26, 6 ♂♂, 1 ♀; South Fork, 6,400 feet, July 20, 1 ♂; cienega at head of South Fork, 8,500 feet, June 28, 2 ♂♂; cienega on south slope of Sugarloaf, 6,700 feet, July 22, 1 ♀.

40. **Hemiargus isola (Reakirt) Scudder.**

Two examples: Fish Creek, 6,500 feet, June 23, 1 ♂; South Fork Santa Ana, 7,000 feet, June 27, 1 ♀.

41. **Leptotes marina (Reakirt) Scudder.**

Seen sparingly in the black oak belt, especially around a shrub (*Amorpha californica*) occurring only in that belt. Fish Creek, 6,500 feet, June 19, 1♂; South Fork Santa Ana, 7,000 feet, June 27, 1♂.

42. **Copæodes candida Wright.**

Two specimens: Santa Ana, 6,500 feet, July 25, 1906, 1♂; near mouth of Fish Creek, 6,500 feet, June 19, 1905, 1♀. Wright records this from the San Bernardino Valley, but it evidently occurs also to quite an elevation in the mountains.

43. **Ochlodes agricola (Boisduval) Scudder.**

Three ♂♂, Fish Creek, 6,500 feet, June 19, 1905.

44. **Thymelicus sylvanoides (Boisduval) Dyar.**

Fish Creek, 6,500 feet, June 18, 1♂.

45. **Erynnis columbia (Scudder) Scudder.**

This was by far the most abundant skipper in the region, ranging up into the Canadian zone about cienegas. The greatest numbers appeared to occur in Lower Transition, where on beds of clover along streams it convened in the hottest part of the day along with the blues. It was numerous also in the open woods of the black oak belt flying about and alighting upon almost any sort of herbage. The thistles were favored more than any other flower, though yerba santa was a close second.

There is considerable variation in our series in the color of the under sides of the secondaries and in size, but all seem to belong to the same species.

Seven Oaks, 5,100 feet, July 7, 1 ♀; Fish Creek, 6,500 feet, June 22–July 5, 14 ♂♂, 6 ♀♀; South Fork Santa Ana, 6,200–7,000 feet, June 30 and July 1, 10 ♂♂, 5 ♀♀; cienega towards head of South Fork, 8,500 feet, June 27, 1 ♀; cienega on south slope of Sugarloaf, 6,700 feet, July 22, 1 ♀; Bluff Lake, 7,500 feet, July 18–21, 3 ♂♂ 1 ♀.

46. **Epargyreus tityrus (Fabricius) Hübner.**

This showy skipper was common in the Lower Transition zone to which it appeared to be exclusively confined. The largest numbers were obtained around thistles (*Carduus bernardinus*) in the black oak belt. Fifteen examples: Fish Creek, 6,500–7,000 feet, June 20–30, 2 ♂♂, 7 ♀♀; South Fork Santa Ana, 6,200–6,700 feet, July 1–24, 3 ♂♂, 3 ♀♀.

47. **Thorybes mexicana (Herrich-Schaeffer) Scudder.**

Four examples: Fish Creek, 7,000 feet, June 30, 1 ♂, 1 ♀; South Fork Santa Ana, 6,200 and 7,000 feet, June 27 and July 1, 1 ♀ ♂.

48. **Thanaos funeralis (Scudder & Burgess) Dyar.**

Two examples; Fish Creek, 6,500 feet, June 23, 1 ♀; Bluff Lake, 7,500 feet, July 21, 1 ♀.

49. **Thanaos tristis Boisduval.**

This black skipper occurred in relatively small numbers up through Lower Transition. It was taken about bare wet sandy places in the canyons, and on flowers of thistle (*Carduus bernardinus*). The eight specimens secured agree fairly well with *tristis* as described in Wright's book, but are somewhat smaller with some differences in the white-spotting of the fore wings. It may be that a new name is needed, but we deem it better to wait for a much-needed revision of this difficult genus. Fish Creek, 7,000 feet, June 30 and July 5, 1 ♂, 1 ♀; South Fork, 6,200–6,700 feet, June 30–July 24, 3 ♂♂, 1 ♀; Seven Oaks, 5,100 feet, July 7, 1 ♂; Bluff Lake, 7,500 feet, July 21, 1 ♀.

50. **Pyrgus montivaga (Reakirt) Dyar.**

Noted commonly only in the sage belt, barely into Lower Transition. Its light color blended so closely with the gray tone of the sage (*Artemisia tridentata*) as to make it very difficult to discern even in flight. Seven Oaks, 5,100 feet, July 7, 1 ♂; Fish Creek, 6,500 feet, June 19, 1 ♂; same, 7,000 feet, June 30, 1 ♂.

51. **Hesperia ericetorum (Boisduval) Dyar.**

But one specimen: ♂, Fish Creek, 6,500 feet, July 5, 1905.

ILLUSTRATIONS OF THE LARVÆ OF FIVE DOMINICAN SPHINGIDÆ.

BY A. HYATT VERRILL,

ROSEAU, DOMINICA, B. W. I.

The accompanying plate has been prepared from sketches of Dominican caterpillars which I made from nature. The adults were determined by Dr. Dyar of the U. S. National Museum. The following species are represented:

Fig. 1. *Xylophanes tersa* Linnæus.
2. *Protoparce harterti* Rothschild.
3. *Madoryx oiclus* Cramer.
4. *Epistor lugubris* Linnæus.
5. *Pholus labruscæ* Linnæus.

DESCRIPTIONS OF NEW AMERICAN LEPIDOPTERA.

BY HARRISON G. DYAR, PH.D.,

WASHINGTON, D. C.

Family PAPILIONIDÆ.

Papilio belus Cramer, variety ingenuus, new.

Fore wing without spots; hind wing above dark-green throughout, the subcostal spot large, pale yellowish green; four discal spots below, successively smaller, the last vestigial, orange yellow, contrasting in color with the subcostal spot. Fore wing below with diffuse yellowish spots above anal angle; hind wing with six rather thin red submarginal spots, the white admarginal dots small.

One male, Orizaba, Mexico (R. Mueller).

Type. — Cat. no. 10221, U. S. Nat. Mus.

Similar to *P. belus varus* Koll, from Honduras, but the spots on the hind wings are of two colors.

Family HESPERIIDÆ.

Thymelicus erynnioides, new species.

♂. Fulvous above, the fore wings blackish at base and with a broad outer border broken subapically by three small fulvous dots; stigma large, slightly curved, reaching from vein one to the base of three, black edged above and with a black patch below. Hind wings broadly fulvous on the disk, the black edging narrow. Hind wings below fulvous, the anal area lighter; a straight row of white spots across the discal venules, one below cell, one in cell and one above, the two near the cell edged with black within.

♀. Without the stigma, but otherwise as in the male. Below the ground color of the hind wings is greenish yellow, the anal area fulvous, the spots small, white, edged with black on both sides, although small, very distinct, yet cut short at the costal area.

One ♂, two ♀♀, Monterey Co., California, through Mr. George Franck.

Type. — Cat. no. 10252, U. S. Nat. Mus.

The species looks like a form of *Erynnis comma* Linn., and may possibly have been described under that species; but the black area below the stigma of the male is distinct.

Family SATURNIIDÆ.

Hylesia coadjutor, new species.

Nearly allied to *H. lineata* Druce. It is larger, paler and more uniformly colored, the outer margins of the wings entire, the hind wings especially being without any angle on the margin. Markings as in *lineata* but less contrasted, the lines of the fore wings olivaceous brown, their bordering shades pale but not contrasted; discal cloud obscure. Hind wings with the discal ring more elongate than in *lineata*, the two outer dark lines obscure, well separated. Beneath on the hind wings the apical streak defining a light shade is absent.

One male, Orizaba, Mexico, October (R. Mueller).

Type. — Cat. no. 10193, U. S. Nat. Mus.

Family SYNTOMIDÆ.

Mystrocneme dulcicordis, new species.

Head black with a diffuse patch of bluish white hairs on the vertex. Thorax black, a large red spot on the disk behind, followed by a narrow white line. Abdomen crimson with the basal segment black. Fore wings smoky black, nearly opaque outwardly, subhyaline on the cell and below; hind wings subhyaline throughout, the veins black, the apices narrowly infuscated. Legs black. Expanse, 28 mm.

Two males, Mexico City, Mexico, October 1906; Orizaba, Mexico, September 1906 (R. Mueller, no. 454).

Type. — Cat. no. 10150, U. S. Nat. Mus.

Family LITHOSIIDÆ.

Hypoprepia muelleri, new species.

Head and thorax dark gray; abdomen gray, anal tuft red above, a few pink hairs at base of abdomen. Fore wings uniformily dark gray with a small pinkish red patch at the extreme base. Hind wings thin, semitranslucent, pale pink, with a broad gray border. Beneath as above, but paler. Legs entirely gray. Expanse, 25–27 mm.

Two males. Mexico City, Mexico, May 1906 (R. Mueller, no. 19.)

Type. — Cat. no. 10149, U. S. Nat. Mus.

Family NOCTUIDÆ.

Hydrœcia stenocelis, new species.

Thorax ochraceous, mixed with purplish brown. The erect tuft may be present, but it is depressed and partly destroyed in the specimen. Fore wing ochraceous, this color appearing in the lower part of median space and before outer line, the rest of wing suffused with purplish brown, the terminal and subterminal spaces entirely so. Inner line double, nearly straight, obscure ; median line nearly straight across wing, a little bent on median vein, dark brown, distinct ; outer line curved on its upper half, straight below, dark brown, distinct, with a narrow faint inner duplication ; subterminal line nearly lost, indicated by an irregular row of ochraceous dots in the purple outer space ; veins in this space dark lined. Spots bright white, narrow, straight, the orbicular and claviform forming a slender bar, narrowly cut by the median vein, the reniform forming a long slightly oblique bar. Hind wings blackish with pale ochraceous fringes. Expanse, 35 mm.

One female, Baltimore, Md., through Mr. George Franck.

Type. — Cat. no. 10246, U. S. Nat. Mus.

The spots are as in *speciosissima* G. & R., but the species is much smaller, the outer line is not angled, the terminal space is solidly filled with purple and the hind wings are dark.

Trileuca delicia, new species.

Size and shape of *T. buxea* Grote, with the same pattern of markings. Color not shining pale ocherous, but creamy ocherous, powdery, without any yellow tint. The lines are brown, fine, flexuous, but more distinct and contrasted than in *buxea ;* terminal space and fringe brown suffused. Hind wings whitish, a little yellow tinted only on the extreme margin towards the apical part.

One male, Milwaukee Co., Wisconsin (F. Rauterberg collection), sent by the Milwaukee Public Museum.

Type. — Cat. no 10253, U. S. Nat. Mus.

Family PYRALIDÆ.

Cacotherapia ponda, new species.

Fuscous gray, the wings uniform, scarcely at all diluted with lighter shades. Inner line of fore wings black, rather broad, distinct, edged basally by a lighter area, outwardly waved at subcostal and median veins, most broadly at the lower flexure. An upright black discal bar, followed by a lighter shade. Outer line like the inner, nearly straight, bent a little in the middle, followed by a lighter shade. Hind wings whitish gray with pale fringe. Expanse, 17–30 mm.

Three males, Claremont, California (C. F. Baker).

Type. — Cat. no. 10151, U. S. Nat. Mus.

Family TINEIDÆ.

Anaphora orizabæ, new species.

Light reddish to dark brown, the fore wings mottled-reticulate in dark brown ; a quadrate patch at the end of the cell and an angled one, [illegible] submedian vein, both relieved by yellowish shades. Hind wings dark brown. The markings vary in distinctness and are in general fainter and more diffuse in the female, being also more purplish in that sex. The male genitalia have the uncus bent at a sharp angle, the points well separated; lateral claspers with the tips broadly rounded, with a sharp, widely angled projection on the lower side. The structure is as in Lord Walsingham's figure of *ferruginea* (Trans. ent. soc. London, 1887, pl. viii, fig. 15), but the lower projection is sharply angled and ends in a point. Expanse, ♂, 32–35 mm.; ♀, 37–42 mm.

11 ♂, 13 ♀, Mexico, from Mr. Schaus, without specific locality; Orizaba, Mexico, August, 1906 (R. Mueller, no. 461).

Type. — Cat. no. 10159, U. S. Nat. Mus.

Resembles the North American *popeanella* Clemens, but is larger and more distinctly marked.

Felderia cassicordis, new species.

Fore wings gray, mottled with dark brown, showing three large dark patches, two on the submedian fold and one at the end of the cell. Two specimens are so marked, two others are without markings on the wings, uniform silky brown, darker along the costa. Hind wings gray-brown. The male genitalia are essentially as in *cossoides* Felder & Rogenhofer, but the wings are differently shaped, being narrow and elongate; the abdomen extends unusually far beyond the hind wings. Expanse, 23–25 mm.

Four males, Mexico City, Mexico, June and July, 1906 (R. Mueller, no. 463).

Type. — Cat. no. 10153, U. S. Nat. Mus.

◆

GEOMETRID NOTES.

BY LOUIS W. SWETT,

BEDFORD, MASS.

A NEW CLEORA.

Cleora pexata, new species.

Antennæ bipectinate, apex simple, hind tibia swollen, 2 spurs, with hair pencil, at base of antennæ ivory white, body and thorax light ash gray, on each segment of abdomen are twin black dots. Fore wings quite pointed, light ash gray, pinkish tinged, with four wavy notched lines, black in color, running from four black, prominent, costal patches. Basal line appears most noticeable on veins, as do all the others, the mesial runs through small discal spot, and runs from there at an angle towards thorax to inner margin, the line making 3 or 4 prominent spots on veins. The extra discal also runs back at an angle to inner margin being toothed noticeably on veins. The submarginal line is a trifle blacker and more prominent than the others and makes a [illegible] parallel with outer edge of wing. There are prominent black dots at ends [illegible] at base of fringe. Hind wings same color as fore, a

a curved line parallel
ends of veins at

basal toothed line which runs in a slight curve from margin to margin, close beneath and about the middle of hind wings, an extra discal line which makes a deep dip below discal spot and then runs high up on outer margin. Beneath the discal spots faint, a faint spot on middle of costa, wings a paler ash gray than above with no markings except a black patch near tips of fore wings, which seems to fade out at vein 4. Expanse, 34 mm.

Locality. — Huachuca Mts., Arizona, Aug. 17, 1903.

Type. — Two males.

NOTE ON SYNONYMY.

Through an error *Caripeta piniata* Packard was left out as a synonym of *Caripeta angustiorata* (Jour. N. Y. Ent. Soc., XIV, 128, 1906) and the synonomy should read:

Caripeta angustiorata Walker.
piniata PACKARD.
seductaria STRECKER.

NOTES ON THE LARVÆ OF DATANA ROBUSTA STRECKER.

By GEORGE H. FIELD,

SAN DIEGO, CAL.

Last winter I made up my mind to find if possible the larvæ of two moths: *Hemileuca electra* and *Gloveria medusa*. About February 1st my friend, Mr. Frank Stephens, the author of "California Mammals," wrote on a card this description of *G. medusa*, given him by Mrs. Katherine Brandegee, the well known botanist, and also a resident of San Diego: "Large, dull brownish black, with one white spot in middle of fore wing. Food plant, Rhus. Lived in caterpillar state eight months or more, and in the pupa state one to two months." I then began to search the *Rhus laurina*, and at last I was rewarded by finding close to my home a bush where a colony of some kind of larvæ had fed, but no live caterpillars could I find. I continued my efforts for some time but without success. I read the description to one of my sons and he said he had observed the larvæ about a month previously, but his memory was evidently at fault, as I feel perfectly safe in stating that all larvæ disappear by November 20th, save possibly a much belated lone one or two. Not being able to find the things sought, I resolved to be there on schedule time when next they came. Some time in March, my son, who had evidently been doing some thinking on the subject, took a trowel and dug around the base of a *Rhus* where the leaves gave evidence of having furnished the necessaries of life to a colony of something, and was rewarded by unearthing several pupæ. The digging was continued at odd times until we had about fifty. These were placed in earth in two cigar boxes and the boxes were placed in a large breeding cage. Of course I knew(?) I had *G. medusa*. On September 1st the first adult appeared, but it was not *G. medusa* by any means. A friend owned Holland's "Moth Book" and he decided it was *Datana integerrima*. Later he expressed doubt on his first statement and thought it might be *D. californica*. If it was the latter I knew it would be of more value for exchange purposes than the former. To settle the question I forwarded two specimens to Dr. Dyar which were identified as *D. robusta*. If my memory serves me rightly, the larvæ appeared about September 15th. While very young and up to the time that they reach at least one-third of their growth they cluster closely, but afterward they separate, each going by itself. The thought came to me, how do they get the necessary food while clustering? Do they separate in the darkness to feed and return to herd together in the day? I am very much of the opinion that this is correct. That they feed in the night is true. In fact I think that they are more active after nightfall than in day time. One can hear them feeding very distinctly two or three feet away from the breeding cage. When nearly grown they feed day and night. On attaining their full growth they descend and enter the ground to pupate. The soil under the *Rhus* where I found the pupæ was for four or five inches in depth, composed almost entirely of decayed leaves and small branches that had accumulated for years, making it very light and porous. This rested on a hard subsoil of clay. The larvæ would usually go down to this hard subsoil to pupate, but do not enter it except so far as to make a little bed to lie in. I would mention here that the pupæ are perfectly naked and have no covering whatever, while in that state. A considerable number would not reach the subsoil, but pupate in the light top soil. As I stated I had fifty pupæ but through ignorance or carelessness which probably created unnatural conditions I succeeded in obtaining only about a dozen adults.

Dr. Dyar describes the larvæ as follows:

"Similar to *D. perspicua* G. & R., but the yellow lines narrower. The color of the body in the mature larvæ is black, not red in any of the specimens sent. The lines are yellow, narrower than the intervening spaces throughout, separated at the ends; dorsal space rather broadly black; head, cervical shield, anal plate and leg-shields black. Hairs all whitish, rather abundant. There are four yellow lines on each side above the feet, a narrow, broken pedal one and a broader distinct medio-ventral one, the ventral areas between the abdominal feet red."

NEW ENGLAND CATERPILLARS; NO. 1.

By Wm. T. M. Forbes,

Worcester, Mass.

Argynnis aphrodite Fabricius.

Body dull black, with faintly paler spotting; jet black around the hornbases. In structure belongs strictly to *Argynnis;* spines all equal, as long as width of joint with lateral spinules a third length of spine over all. Dorsal spines black, upper laterals on abdomen with faint horn-colored bases, lower laterals and laterals of thorax pale horn-color, except the very tip. Legs black, tips of abdominal ones paler. Paler below. The pale ground forms a sort of double dorsal line between the black subdorsal spots. 1¼ inches long when resting.

Granby, Mass., June 6, 1906, well grown. Hung up June 18, in a rudimentary cocoon; pupated June 20; exit July 10, a crippled but perfectly normal female.

Scudder has good descriptions of the other Eastern Argynnides in *The Butterflies of New England*, but only a brief note on *aphrodite.* I have seen no full description.

Table of the Eastern Species of Argynnis.

Black, with spinules less than half length of spines.
  Rich black, all spines horn color at base...*cybele.*
  Black and paler mottling, lateral spines only with pale ....*aphrodite.*
Deep purplish, with spinules half length of spines..*atlantis.*

Alcestis is apparently unknown.

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Class I, HEXAPODA.

Order I, HYMENOPTERA.

NOTES ON TRICHOGRAMMA PRETIOSA RILEY.

By A. Arsène Girault,

Washington, D. C.

1. *Copulation.* — During the early morning of June 14 (8 A. M.), many adults of this little parasite issued from host eggs and were at once confined under a suitable glass jar. At 10 A. M., observation showed that the males were running very actively among the females, fertilizing them. Both sexes were freely mixed and active. During the act of copulation, the female is almost a passive agent; she often struggles, however, to rid herself of the male. The latter is very persistent in his advances, and is also polygamous,— one has been observed to unite with three females in succession. Sometimes a female is besieged by several males, at which time there is a fierce struggle for possession. Again, a male may unite with the same female twice in succession, with an interval of but two or three seconds between. The copulation is normal for the Hymenoptera, but the position assumed by the male is peculiar. After seizing the female, he takes an inclined position, leaning far back at an angle of about sixty degrees, the tip of the abdomen well under the venter of the female and curved up between her posterior legs. The act lasts for about three and a half seconds. The pair may be motionless or running about. Copulation generally follows soon after emergence, but may be delayed. On the part of the females, it is almost immediately followed by oviposition.

2. *Proportion of the Sexes.* — In an examination of 763 specimens of this insect reared during the entire season from the usual host eggs, the sexes were found to exist in about equal proportions, with a slight preponderance of the females, as shown in the attached table.

TABLE I. *Proportion of Sexes.*

Lot No.	Date, 1904.	No Adults.	Males.	Females.	Source.
1	May	26	16	10	Reared.
2	May 6	5	3	2	From 2 hosts.
3	May 23	8	4	4	From 2 hosts.
4	May 23	8	4	4	Captured.
5	June 3	4	2	2	From a single host.
6	June 3	2	1	1	From a single host.
7	June 4–8	28	12	16	From many hosts.
8	June 6	7	2	5	From 4 hosts.
9	June 7	5	3	2	Reared.
10	June 8	3	1	2	From a single host.
11	June 12	2	2	0	From a single host.
12	June 12	2	2	0	From a single host.
13	June 14–16	19	12	7	From 22 hosts.
14	June 22	2	1	1	From a single host.
15	June 22–25	41	28	13	From many hosts.
16	June 27	4	2	2	From a single host.
17	July 1	20	18	2	From many hosts.
18	July 20	2	0	2	From a single host.
19	July 28	10	1	9	From 6 hosts.
20	July 28	12	8	4	Reared.
21	July 29	16	6	10	Reared.
22	July	9	3	6	Reared and captured.
23	Aug. 2	11	6	5	Portion of lot from many hosts.
24	Aug. 2	40	12	28	From 30 hosts.
25	Aug. 21	20	10	10	From many hosts.
26	Sept. 12	33	11	22	From 35 hosts.
27	Sept. 22	83	41	42	From 36 hosts.
28	Sept. 25	111	53	58	From 64 hosts.
29	Oct. 4	8	2	6	From 4 hosts.
30	Oct. 5	44	23	21	From 34 hosts.
31	Oct. 14	24	8	16	Reared.
32	Oct. 18	6	2	4	From 2 hosts.
33	Nov. 4	3	1	2	From a single host.
34	Nov. 7	16	8	8	Collected from reared specimens.
35	Misc. during season	129	57	72	Various, mostly reared.
Totals		763	365	398	

The proportion of the sexes in the variety *nigra* Girault is as 24 males to 27 females. The proportion of the sexes in specimens reared from single hosts may be seen by consulting the table just presented (lots No. 5, 6, 10, 11, 12, 14, 16, 18 and 33); the sexes vary in relative numbers, but are about equal on an average. In four cases not given in the table, however, hosts collected from the field September 27, three parasities issued from each, the proportion being one male to two females, a total of four males and eight females. From eight eggs of *Alabama argillacea* Hübner, collected in late October from cotton plants, the females generally exceeded the males in number, thus:

Host No.	No. Adults.	Males.	Females.
1	2	0	2
2	2	1	1
3	3	1	2
4	1	0	1
5	2	1	1
6	3	1	2
7	2	1	1
8	3	1	2
Total	18	6	12

As to the relative time of issuing of the sexes, it appears that there is little or no difference. For example, from a lot of host eggs parasitized on June 22, there issued between 1 and 2 P. M., June 30, 2 males and 3 females; at 3 P. M., 3 more females had emerged, and from that hour on both sexes appeared at intervals for some hours. Between the hours of 2 and 3 P. M., June 27, 2 males and 2 females issued from a single host; from 6 to 8 A. M., October 4, 2 males and 6 females appeared from 3 hosts parasitized at the same time, and again from a single host, there issued simultaneously at 3 P. M., June 27, 2 males and 2 females. In the genus *Anaphes* of a closely related family of egg-parasites, it is indicated that the relative issuance of adults is about the same as in *Trichogramma*, whereas in *Telenomus*, more remote, relative issuance of the sexes is more regular, the males preponderating for the first day or so, then the females becoming the more numerous.

3. *Size not Indicative of Sex.*—As a rule the females are larger than the other sex, but this cannot be relied upon to distinguish them, as sometimes the reverse is the case. From a large series of measurements, the following table is adduced, showing the range in size and general average for each sex.

TABLE II. *Relative Size of the Sexes.*

Sex.	Length, mm.			
	Maximum	Minimum.	Range.	Average.
Male...............	0.45	0.20	0.25	0.34
Female............	0.50	0.25	0.25	0 38

The foregoing notes are derived from observations made during the Cotton Bollworm Investigations in Texas, 1904, by the Bureau of Entomology, U. S. Department of Agriculture. Unless otherwise specifically stated, the cotton bollworm, *Heliothis obsoleta* Hübner, was the host, and the observations were made at Paris, Texas. These notes are given in abstract by Quaintance and Brues in Bull. No. 50, Bureau Ent., U. S. Dep. Agric., pp. 118, 119.

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Class I, HEXAPODA.

Order II, COLEOPTERA.

NEW SCARABÆIDÆ.

By CHAS. SCHAEFFER,

BROOKLYN, N. Y.

The rearrangement of the Museum collection of Scarabæidæ necessitated the identification and study of recent accessions as well as of some species collected by myself near Brownsville, Texas, and in the Huachuca Mts., Arizona, which were still unnamed.

The collection of the late Ottomar Dietz contains a great number of unnamed species of *Diplotaxis* mostly from New Braunfels, Texas. These I have attempted to identify in connection with those collected by myself, but, without the study of the types and with the descriptions only, poor results were obtained, as Dr. Leconte's descriptions are too short to identify most of the species with any degree of certainty. From the number of unnamed species, most of which are probably new, I have given names to those only, which possess at least some prominent and strong character, which would have been noticed and mentioned by Leconte in his descriptions, had the species been known to him.

Aphodius sallæi Harold.

Berl. Ent. Zeitsch., 1863, p. 336.

Specimens agreeing with Von Harold's description were taken at light near Brownsville, Texas. Bates in the "Biologia" records it from Mexico to Costa Rica.

This species is similar in form to *ruricola*, dark brown, elytra paler with some of the intervals either entirely or partly dark brown or piceous; the striæ are deeply impressed and crenately punctate; the intervals feebly convex and finely punctate; the thorax is finely punctate, with some larger punctures intermixed; head trituberculate, feebly so in the female; genæ distinct; clypeus emarginate in front with angles reflexed and rounded; mesosternum not carinate.

Aphodius arizonensis, new species.

Moderately elongate, reddish brown. Head densely punctate, front feebly tuberculate; genæ prominent, rounded; clypeus more coarsely punctate than the head, frontal margin reflexed and arcuate-emarginate, angles rounded; margins not fimbriate. Thorax twice as wide at base as long, scarcely narrowing to the front; sides feebly arcuate, margin not explanate; front and hind angles rounded; base finely margined; surface finely punctate with coarser punctures intermixed, the coarser punctures more numerous and denser at sides, on the disk a smooth median line. Elytra not wider than the thorax at base; humeri obtuse; sides feebly arcuate; striæ moderately deeply impressed, not very coarsely punctate; intervals slightly convex, finely punctulate. Underside finely punctulate. Mesosternum not carinate. Anterior tibiæ strongly tridentate externally; impunctate on the upper surface; first tarsal joint shorter than second. Posterior femora sparsely punctulate; apex of hind tibiæ with equal spinules, first joint as long as the next three. Length 5 mm.

Huachuca Mts., Arizona.

This species resembles *militaris* somewhat, but has to be placed in Dr. Horn's group B. From all the species in this group it will be readily recognized by its uniform reddish brown color.

Bradycinetus serratus var. peninsularis Schaef.

Trans. Am. Ent. Soc., vol. XXXII, p. 252.

This variety, which I described from Lower California, occurs also in Arizona (Phoenix).

Diplotaxis rugosioides, new species.

Form of *sordida*, black with feeble æneous luster. Head coarsely densely punctate; genæ not prominent; clypeal suture distinct at sides, obliterated at middle; clypeus coarsely and densely punctate, margin reflexed and emarginate at apex, angles broadly rounded. Thorax slightly more than twice as wide at base as long; sides arcuate slightly behind middle, obliquely narrowing to base and apex; basal angles obtuse, apical angles acute; a depression near basal and apical angles also along the base; surface moderately coarsely and very densely punctate, clothed with very short, erect, pale hairs. Elytra a little longer than one and a half times the basal width, slightly widening to apex; surface rugose with feebly impressed striæ and extremely short semi-erect, pale hairs. Pygidium densely confluently punctate. Labrum arcuately emarginate. Metasternum moderately coarsely punctate. Ventral segments with slightly smaller, submuricate and more sparsely placed punctures. Anterior tibiæ tridentate. Claws cleft, but the lower part broader and much smaller than the upper and obliquely truncate at apex. Length 11 mm.

Hampton, New Hampshire (S. A. Shaw).

This species looks very distinct, but differs very little from *sordida*, except in the absence of dense, yellowish pubescence of the thorax and also the much shorter and scarcely visible pubescence on the elytra. I have examined a number of specimens of *sordida*, but the thoracic pubescence, even in old worn examples, seems to be persistent, while there is no trace of longer yellowish hairs in *rugosioides*, in which the short greyish hairs can only be seen from a lateral point of view. The form is also more depressed and not as convex as in *sordida*.

Diplotaxis muricata, new species.

Oblong, dull black, elytra with rows of pale recumbent hairs. Head coarsely cribrately punctate, clypeal suture almost obliterated; clypeus short, apical angles rounded, scarcely reflexed and very feebly emarginate in front, genæ nearly continuous with the clypeus. Thorax twice as wide at base as long; sides arcuately rounded, the widest part at middle; apical angles sub-acute, basal angles distinct but obtuse; surface densely and very coarsely punctate, punctures less dense and more separated on the disk; from each puncture arise pale, short hairs. Elytra not quite one fourth longer than wide; humeral angles distinct; sides nearly parallel, very feebly widening behind; costæ almost indistinguishable; punctuation coarse and somewhat muricate; viewed laterally, there are a number of nearly regular rows of short, recumbent, pale hairs. Underside very coarsely punctate, punctuation sparser on the abdominal segments; pygidium and propygidium coarsely, cribrately punctate, but the latter only so in a transversely impressed apical space; labrum broadly, but not deeply arcuate-emarginate; maxillary palpi oblong-oval; prosternum carinate; front tibiæ tridentate, the upper tooth further removed from the second than the latter is from the first; tarsal joints rather short and stout; claws cleft, the lower part broader and much shorter than the upper and obliquely truncate. Length 5 mm.

Alpine, Texas (H. F. Wickham).

I received two specimens of this distinct species from Mr. Warren Knaus under the name of *puberulus*, one of which he kindly presented to me. From *puberulus* it differs in form of thorax and elytra, punctuation and pubescence; from *brevisetosa* the form and punctuation of elytra and claws will separate it.

Diplotaxis sparsesetosa, new species.

Robust, black. Head coarsely and densely punctate; genæ distinct, but continuous with the sides of the clypeus; clypeal suture absent; clypeus more densely punctate than the head, apical margin feebly reflexed and scarcely emarginate, angles broadly rounded. Thorax twice as wide at base as long; apex slightly narrower than base; sides arcuate; surface very coarsely punctate, punctures well separated on the disk, dense at sides. Elytra not quite one and a half times as long as wide at base, widening towards apex; costæ distinct and with a row of smaller punctures; punctures of intervals, between the geminate rows of punctures, confused, coarse, but not dense, each bearing a very short, pale hair, which is more apparent when the specimen is viewed laterally. Propygidium with a deep, transverse, well-limited and coarsely punctate impression. Abdominal spiracle rather prominent. Pygidium extremely coarsely and confluently punctate. Labrum broadly arcuate-emarginate. Anterior tibiæ tridentate, the upper tooth twice as far from the second, as the latter from the first. Claws cleft, the lower part broader and much shorter than the upper and truncate at apex. Metasternum and abdomen coarsely but not densely punctate, the latter still more coarsely punctate at sides. Length 9 mm.

Texas (Dietz).

From the above described *muricata* this species differs in being more robust, the elytra widening towards apex, much shorter and finer pale hairs and the elytral punctuation different.

By description it seems to be allied to Linell's *brevisetosa*, but that species has the lower part of the cleft claws nearly as long as the upper. Superficially *sparsesetosa* resembles *connata* somewhat, but is widely separated from that species. In describing *connata* I compared it with *Lachnosterna epigæa* which is not correct; it has rather the form of *cribrosa* than *epigæa*.

Diplotaxis arizonica, new species.

Oblong, ferruginous, clypeus on each side rather strongly sinuate, each elytral puncture with a short, recumbent pale hair. Head coarsely and densely punctate; clypeal suture impressed; genæ not prominent, continuous with the clypeus; the latter broadly emarginate in front, sides rather strongly sinuate near apical angles, margin and front reflexed. Thorax twice as wide at base as long; sides broadly arcuate slightly behind middle, strongly narrowing to base and slightly sinuate before the latter, obliquely narrowing to apical angles, the latter acute, basal angles nearly rectangular; disk with moderately coarse, but not densely placed punctures. Elytra slightly wider than the thorax at base; first costa well defined, second more obscured by the punctures at sides, both costæ almost without punctures; the row of punctures on each side of the costæ distinct, the punctuation between these confused; from each of the elytral punctures arises a short, semi-erect, pale hair. Pygidium coarsely but not densely punctate, propygidium transversely impressed at apex and coarsely punctate, posterior spiracle moderately prominent. Underside coarsely punctate, labrum moderately deeply arcuate-emarginate; last joint of maxillary palpi oval; front tibiæ tridentate, the upper tooth further removed from the second than the latter from the apical tooth; claws cleft, the upper and lower part equal in width, but the lower slightly shorter than the upper. Length 8 mm.

Huachuca Mts., Arizona.

The distinguishing characters of this species are the strongly sinuated sides of clypeus, the distinct, but slightly obtuse hind angles of thorax and the very short, sparse, pale hairs on elytra.

Diplotaxis knausii, new species.

Elongate, narrow, ferruginous, labrum prominent and very deeply emarginate. Head densely and moderately coarsely punctate; clypeal suture distinct at sides, obliterated at middle; above the clypeal suture a subtriangular, shallow, median depression; clypeus reflexed in front and broadly emarginate, angles rounded, genæ not prominent, continuous with the clypeus. Thorax transverse, sides arcuate slightly behind middle; apical and basal angles obtuse; surface on each side near front angles slightly impressed and rather densely punctate at sides, punctures moderately coarse and on the disk less densely placed than at sides. Elytra nearly one and a half times as long as wide at base; sides almost parallel; costæ feebly distinct and finely submuricately punctate; the punctuation between the suture and the first geminate row of punctures confused, those between the first and second row forming almost regular rows of punctures. Pygidium very coarsely and confluently punctate, propygidium more feebly punctate in an apical transverse line. Labrum prominent, very deeply divided. Mentum rather deeply emarginate. Front tibiæ tridentate, the upper tooth more distant from the second, than the latter from the first. Front tarsi subcompressed; first joint triangular, second and following elongate; claws cleft, the lower part slightly shorter than the upper. First and second ventral segment on each side of middle with a more or less prominent elevation, which is irregularly striate; third with a very feeble elevation. Length 9 mm.

Las Vegas, Nevada.

This interesting and very distinct species is dedicated with pleasure to Mr. Warren Knaus, to whom I am indebted for the single male. The female, which is in the collection of Mr. Knaus differs from the male in having slightly shorter hind tarsi, in being a little more robust and having the first joint of front tarsi scarcely triangular.

There will be no difficulty in distinguishing both sexes of *knausii* from any known species by the prominent and deeply divided labrum, the triangularly emarginate mentum, the distinct elevations on second and third ventral segments and in addition the somewhat compressed, triangularly dilated first joint of front tarsi of the male.

Diplotaxis tarsalis, new species.

Oblong-oval, ferruginous or piceus. Head not densely punctate, punctures not coarse and well separated; clypeal suture distinct, broadly arcuate at middle; genæ not prominent, continuous with the clypeus; clypeus densely and more coarsely punctate than the head, sides and apical margin reflexed, the former feebly sinuate before the rounded apical angles, apical margin truncate-emarginate. Thorax at base slightly more than twice as wide as long; sides somewhat explanate, especially near basal third and feebly arcuate; hind angles rounded, front angles feebly rounded; disk remotely not coarsely punctate, punctures at sides a little denser and coarser. Elytra about one and one half times as wide at base, gradually widening to apex; costæ feebly convex and with an irregular row of punctures; intervals, between the geminate rows of punctures, enclosing the costæ, confusedly punctate. Propygidium transversely impressed, the impression not more coarsely punctate than the rest; last abdominal spiracle somewhat prominent. Pygidium sparsely punctate, the punctures not coarser than those of propygidium; apex somewhat inflexed and rotundate-truncate in the male. Underside coarsely and sparsely punctate, metasternum finely at middle but more densely at sides; front tarsi tridentate; tarsal joints at apical half densely clothed with pale-yellowish, fine pubescence; claws cleft, the lower part broader, slightly shorter than the upper and truncate at apex; maxillary palpi in the male subcompressed and broadly arcuate on inner side, rounded at apex; in the female narrow, elongate with apex obliquely truncate; labrum broadly emarginate. Length 8.5–9 mm.

Huachuca Mountains, Arizona.

Distinguished by the explanate, scarcely deflexed sides of thorax finely and densely pubescent tarsal joints at apical half, and the broad last joint of maxillary palpi of the male.

Diplotaxis pubipes, new species.

Oblong-oval, black with faint æneous luster. Head remotely punctate, punctures not coarse; clypeal suture obliterated at middle, faint at sides; genæ feebly prominent; clypeus more coarsely and densely punctate than the head, sides and apex reflexed, apical angles rounded, apical margin very feebly emarginate. Thorax twice as wide at base as long; apex slightly narrower than base; sides feebly arcuate; basal angles slightly rounded; basal margin with a broad antescutellar depression; surface with moderately large, well separated punctures. Elytra one and a half times as long as wide; sides gradually widening to apex; punctuation confused between the geminate rows of punctures; costæ feebly elevated with a single row of slightly smaller punctures than those of the intervals; at base a circumscutellar impression. Propygidium with a deep, well limited, transverse, apical impression; feebly punctate, except the transverse impression which is coarsely punctate. Pygidium coarsely, remotely punctate. Labrum feebly, broadly emarginate. Maxillary palpi oval. Front tibiæ tridentate. Tarsi densely clothed over nearly the entire underside with yellowish hairs. Claws cleft, inferior portion shorter and broader than the upper and oblique at apex. Abdominal segments sparsely and coarsely punctate. Length 8.5 mm.

Brownsville, Texas (Esperanza Ranch).

The distinct antescutellar thoracic and circumscutellar elytral impressions, together with the densely pubescent tarsal joints, render the recognition of this species easy.

The pubescence occupies nearly the entire under-surface of the tarsal joints and is much denser than in *tarsalis*. By description it seems to be related to the Mexican *juguilensis*, which has the elytra very coarsely, subconfluently punctate, the lateral margin sinuate in front, the basal thoracic and scutellar impressions absent and the front tibiæ of male bidentate.

The specimen described above is apparently a male, which I owe to the kindness of my friend Mr. Gustav Beyer, who collected two or three specimens at light.

Diplotaxis californica, new species.

Oblong-oval, black or dark ferruginous. Head coarsely, cribrately punctate; genæ not prominent, almost continuous with the sides of the clypeus; clypeal suture only visible at sides; above the clypeal suture, from side to side, a transverse, slightly arcuate, prominent swelling, which gives the clypeus, together with the reflexed front margin, the appearance of being deeply excavated; apical margin scarcely emarginate; angles rounded. Thorax at base twice as wide as long; sides strongly arcuate behind middle, obliquely narrowing to the hand angles, which are obtuse, slightly less strongly narrowing to apex, before these feebly sinuate; near the side margin a distinctly impressed line, which is less distinct near apex; surface densely and coarsely punctate, slightly less densely at middle of disk. Elytra slightly wider than the thorax at base, one and a half times as long as wide, feebly widening behind; costæ almost obliterated, but indicated by the row of smaller punctures; first interval, between the sutural row and the geminate row of punctures enclosing the first costa, confusedly punctate, the others forming almost regular rows of punctures. Propygidium sparsely and much more finely punctate than in the transverse apical impression. Pygidium coarsely punctate. Labrum broadly and feebly arcuate-emarginate. Maxillary palpi oval. Anterior tibiæ tridentate. Claws toothed at middle. Ventral segments transversely coarsely punctate at apex, feebly so at base; second ventral segment with two more or less distinct elevations on each side of middle in both sexes. Length 8 mm.

Tulare Co., California (Dietz).

The anteclypeal elevation in this species which is slightly impressed at middle in one female, is much more prominent than in any of my specimens of *excavata* and by this and the elevations on the second ventral segment *californica* will be readily recognized.

The claws are described as being toothed, but are really cleft, with the lower part very short and the oblique apical truncation feeble.

Diplotaxis beyeri, new species.

Elongate, ferruginous. Head rather flat, coarsely punctate; genæ prominent; clypeal suture distinct, arcuate at middle; clypeus as long as the head, coarsely punctate, apical margin strongly reflexed and scarcely emarginate, angles broadly rounded. Thorax twice as wide at base as long; sides broadly rounded, basal and apical angles obtuse; base and sides margined; apex nearly as wide as base; surface moderately coarsely, but not densely punctate. Elytra slightly more than one and a half times as long as wide, not widening behind; punctuation forming almost regular rows, except the first interval, which is confusedly punctate; costæ almost indistinct and with a row of smaller punctures; at apex the rows of punctures are feebly impressed. Propygidium transversely impressed at apex and coarsely punctate. Pygidium coarsely not densely punctate. Labrum broadly arcuate-emarginate. Maxillary palpi elongate-oval. Front tibiæ tridentate, the teeth equally separated from each other. Claws cleft, but the lower part very short and obliquely truncate at apex. Length 10–11 mm.

Brownsville, Texas (Esperanza Ranch).

This fine species is named after my friend Mr. Gustav Beyer, with whom I collected this and many other interesting species on my second trip to that semi-tropical region.

The elongate, nearly parallel sided form and the large clypeus distinguish this species. The head, basal margin and suture are generally slightly darker.

Listrochelus knausii, new species.

Oblong-oval, pale ferruginous, elytra pruinose. Head densely and very coarsely punctate, the transverse carina on the vertex almost absent; clypeus transverse, margin reflexed, apex feebly emarginate. Thorax rotundate-angulate at sides; apical angles acute, basal angles rounded; apex slightly narrower than base; side margins serrulate, more strongly at basal half than near front angles, fimbriate with long hairs; surface coarsely, irregularly punctate, more densely near apical margin. Elytra moderately coarsely punctate, punctures not deeply impressed; sutural costæ more prominent than the discal, the latter very feeble; side margins fimbriate. Underside, except abdomen, densely clothed with pale yellowish, fine, long hairs. Length 11.5–12 mm.

Male.—Club of antennæ as long as the funicle. Fifth abdominal segment broadly elevated at middle, the elevation more densely punctate than the rest of the segment. Pygidium feebly convex, with very few punctures; apex rounded. Posterior tibiæ slender, normal; spurs slender, the inner slightly shorter and rounded at apex; tarsi as long as the tibiæ. Claws feebly crenate, alike on all the tarsi, with a small median tooth.

Female.—Antennal club shorter than the funicle. Pygidium feebly convex and very sparsely punctate. Abdomen convex and very obsoletely punctate. Claws feebly crenate alike on all the tarsi with a small median tooth. Hind tarsi shorter than the tibiæ.

Stockton, Utah.

This species, which was communicated by Mr. Warren Knaus, after whom it is named, has lost nearly all the characters of the genus, but the facies and the feeble crenation of the claws leave no doubt that it is a *Listrochelus*.

By description *knausii* is very close to *sociatus*, near which it has to be placed, but the latter species is said to have the posterior tibiæ stout, resembling those of *Ligyrus*.

Of the species known to me it resembles *fimbripes* in form, color and size, but the claws, abdominal and other characters separate the two.

Anomala clypealis, new species.

Elongate-oval, pale testaceous; thorax with a median darker space, which extends on each side at middle as a narrow line not quite to the side margins. Head rather coarsely punctate, feebly convex; eyes not prominent; antennal club as long as the preceding joints together; clypeal suture straight, distinctly impressed; clypeus rather strongly narrowing to apex, frontal margin rounded and reflexed, sides scarcely reflexed. Thorax twice as broad at base as long, sides feebly arcuate, obliquely narrowing to the front, parallel behind; front angles acute; hind angles rounded, disk rather sparsely punctate, the punctures at sides slightly larger and more crowded, at middle an impressed longitudinal line. Elytra at base slightly narrower than the thorax at base, gradually widening towards apex; costæ between the geminate rows of punctures distinct, feebly convex and very finely and irregularly punctate; subsutural and second interval with a more irregular row of coarse punctures than those of the geminate rows enclosing the costæ, at sides the punctuation forms almost regular rows of punctures. Pygidium convex, rugose, sparsely hairy at tip. Underside coarsely punctate; metasternum with a few erect hairs. Front tibiæ bidentate, apical tooth elongate, curved; outer claw very feebly cleft, the upper portion extremely narrow and short; intermediate scarcely visibly cleft. Length 7 mm.

Arizona (Bakersville?).

One male, sent me by my brother and possibly collected at light in Bakersville.

The feebly cleft claws bring this species near *antennata* and *parvula*, from which the different form of clypeus, thoracic spot, and the rugose pygidium separates it. In the single specimen, the pygidium and also some indistinct longitudinal spaces on elytra are slightly darker.

At the time I published in this Journal, vol. XIV, p. 1, the "Notes on the species of *Anomala*" I prepared a synoptic table of the species then known to me, but withheld the publication of the table, as I intended to include one or two more species, which were recorded as being taken within our faunal limits and which are unknown to me. I expected to receive specimens of these, as well as of some Mexican species from a European correspondent, but for some reason they have not arrived, so I take the present occasion to publish the table.

TABLE OF THE SPECIES OF ANOMALA.

1. Metasternum not protuberant, middle coxæ narrowly separated *.................. 2.
Metasternum protuberant, middle coxæ rather widely separated (subgenus SPILOTA).. 19.

2. Tarsal claws in part cleft, sometimes very feeble (subgenus ANOMALA)........ 3.
Tarsal claws all simple (subgenus RHOMBONYX)...................................... 16.

3. Hind tibiæ (female) shorter than the femora, very broad, triangularly widening to apex; first joint of middle tarsi longer than second; color testaceous, head, two oblique apical thoracic spots of irregular outline and suture darker. **tibialis** Schaef.
Hind tibiæ as long or longer than the femora, of usual form........................ 4.

4. Pygidium punctate, punctures well separated †.. 5.
Pygidium rugose.. 11.

5. Thorax unicolorous.. 10.
Thorax bicolorous, black with side margin more or less testaceous, or testaceous with one or two apical black spots.. 6.

6. Elytral intervals of equal width, convex, rugose, only the subsutural wider and with confused punctuation; striæ impressed, almost impunctate; clypeal margin widely reflexed; color testaceous, head and two spots at apex of thorax darker...**antennata** Schaef.
Two or more of the elytral intervals wider than the others and with confused punctuation, clypeal margin narrowly reflexed.. 7.

7 - Thorax testaceous with two darker apical spots.. 8.
Thorax testaceous with one apical spot, or black with sides paler............... 9.

8. Front tibiæ bidentate, elytra coarsely punctate and subrugose, the costæ indistinct, obscured by the coarse punctuation; color testaceous, two apical thoracic spots and suture darker...**parvula** Burm.
Front tibiæ tridentate, the upper tooth distinct in the larger specimens, in the smaller specimens more feeble; the elytral costæ, as well as the geminate rows of punctures enclosing them, well defined; color testaceous, head, two thoracic spots, elytral suture and side margins black or piceous............**flavilla** Bates.

9. First joint of middle tarsi very distinctly shorter than second; outer claws of front and middle tarsi in the male very feebly cleft, the upper division fine and thin and on the front claw far removed from the tip of the lower division; color testaceous, head, a subtriangular apical thoracic spot, suture and margin of elytra darker..**centralis** Lec.
First joint of middle tarsi as long or longer than second; outer claws of front and middle tarsi in the male distinctly cleft, the upper division as long as the lower, or slightly shorter; color variable, from testaceous, thorax with large apical spot and humeral callus of elytra darker to elytra black, with faint traces of longitudinal testaceous lines and thorax black with side margins testaceous. **inconstans** Burm.

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* In *polychalca* the middle coxæ are more widely separated than in the rest of the species, but the metasternum is not protuberant.

† In some specimens of *inconstans* and *peninsularis* the pygidium is feebly rugose.

10. Pygidium shining, punctuation feeble; color testaceous, head, thorax, scutellum, suture and legs rufous...**peninsularis** Schaef.

Pygidium sub-alutaceous, coarsely punctate; color variable, elytra testaceous without markings, thorax darker and sometimes with feeble metallic luster to greenish metallic and elytra with or without brown or black markings, the latter variable in size..**flavipennis** Burm.

11. Thorax testaceous with large median darker spot or black or æneous with pale side margin.. 12.

Thorax unicolorous black or æneous.. 14.

12. Outer claw of anterior and middle tarsi very feebly cleft, the upper division very fine and thin, almost obsolete and far removed from the tip of the lower division; the first elytral interval near suture divided by an irregular row of punctures; color testaceous, a large apical thoracic spot, some indistinct longitudinal spaces on elytra and pygidium darker ....**clypealis** n. sp.

Outer claw of anterior and middle tarsi distinctly cleft, the upper division as long or nearly as long as the lower; the first elytral interval confusedly punctate. 13.

13. Tooth of front tarsal claw joint obsolete; larger more elongate species; thorax black or blackish æneous with side margins pale; elytra testaceous, without or with black markings of variable size.............................**undulata** Melsh.

Tooth of front tarsal claw joint distinct; smaller, more robust species, color variable, elytra testaceous to nearly black, thorax pale with apical black spot or entirely black...**innuba** Fab.

13. Thorax and elytra black, the latter often with some paler spots or streaks, elytral punctuation very coarse obliterating the costæ on the disk; size small.

black form of **innuba** Fab.

Thorax metallic green, æneous or cupreous.. 14.

14. Elytra with nearly regular, impressed, punctured striæ, intervals subequal, convex, very finely punctate; thorax metallic green, sometimes with slight cupreous tint; elytra metallic green, or bluish green and in some specimens with pale brownish streaks...**polychalca** Bates.

Elytral intervals wider than the costæ, flat and confusedly punctate, elytra testaceous, with dark markings; thorax reddish with metallic tint, green or æneous.

15.

15. The punctures of the geminate series enclosing the elytral costæ, as well as some rows at sides, forming short, impressed and closely punctate, black lines of variable length; the upper division of the outer left front claw of the male very small and very thin, far removed from the tip of the lower division.

ludoviciana Schaef.

The geminate series of punctures regular, not forming short, impressed, closely punctate, black lines, except sometimes at apex; the upper division of the outer front claw of the male distinct, as long or slightly shorter than the lower division..**binotata** Gyll.

16. Frontal suture carinate, color uniform, testaceous .... 17.

Frontal suture obliterated, color variable, never uniform testaceous............ 18.

17. Elytral striæ impressed, very obsoletely punctured, intervals slightly convex, equal, scarcely punctate, only the first interval broader and with an irregular row of large punctures at basal half, surface subopaque........**cavifrons** Lec.

Elytral striæ indistinctly punctate, except the striæ at sides, which consist each of a row of coarser punctures; the first interval confusedly punctate with large punctures, surface shining........ ....**carinifrons** Bates.

18. First joint of hind tarsi shorter than second; first elytral interval divided by an irregular row of punctures, the second with a few very obsolete punctures, clypeal margin very broadly reflexed, color testaceous, head, scutellum, suture and a large thoracic spot of irregular outline darker....................**semilivida** Lec.

First joint of hind tarsi as long as second; first elytral interval coarsely and confusedly punctate, second with a row of coarse punctures; clypeal margin moderately reflexed; color testaceous; head, a large thoracic spot attaining the base, suture and sides of elytra dark brown...............................**minuta** Burm.

19. Pygidium shining, punctured, the punctures on the disk generally well separated... 20.

Pygidium subopaque, densely rugose and pubescent................................ 21.

20. Thorax shining, punctuation sparse, testaceous, with or without discal piceous space or entirely black, elytra from testaceous to black...............**lucicola** Fab.

Thorax subopaque, very densely punctured with æneous luster, side margins pale; elytra testaceous to castaneous.. **oblivia** Horn.

21. Thorax coarsely punctured, shining, dark rufescent, with slight æneous luster, side margins pale...**marginata** Fab.

Strigoderma latitibia, new species.

Form of *pygmæa* but larger; elytra dark brown to fulvous; head and thorax brownish-metallic, in the paler specimens with side margins also pale. Head and clypeus coarsely and densely punctate; clypeal suture impressed; clypeus moderately reflexed. Thorax twice as wide at base as long; sides arcuate slightly before middle, parallel behind, obliquely narrowing to front angles, which are right; surface coarsely and rather densely punctate, feebly impressed on each side, sparsely clothed with moderately long pale hairs. Scutellum with a few coarse, irregularly distributed punctures. Elytra slightly longer than wide, feebly arcuate at sides; three or four striæ nearest suture, regular, the others more or less confused, rather coarsely punctate. Pygidium rugose. Front tibiæ bidentate; front and middle tars cleft, the upper division finer than the lower; hind tibiæ wide and short, about twice as long as wide at apex. Last abdominal segment finely and densely punctulate, the other segments much coarser and sparser. Under side and legs sparsely pubescent with cinereous hairs. Length 8 mm.

Galveston, Texas (F. H. Snow).

This species will be readily identified by the short and broad hind tibiæ of the males, which is the only sex known to me.

The form is similar to *pygmæa* but larger; the color is variable, in the pale specimens the sides of elytra are darker and the sides of thorax pale. The elytral sculpture is similar to that of *pygmæa*, but the striæ are not quite as deeply impressed.

Strigoderma floridana Ohaus.

Stett. Ent. Zeitung, vol. LXVI, p. 285.

This species was described from Titusville, Florida, but I am unable to find anything in the description by which it differs from *pygmæa*, unless it is the "*relativ kurze, hochgewölbte Halsschild.*" The thorax in *pygmæa* cannot be called very convex, though, if compared with *arboricola*, it is certainly more convex than in that species. It is said to be related to *marginata* and *columbica*, and with the first of these two, *pygmæa* was given by Gemminger and Harold as a synonym. From his remark "*die kleinste der mir bekannten Strigodermen,*" it seems that Dr. Ohaus did not have *pygmæa* when he described his *floridana*, as the size he gives for the latter species is exactly that of *pygmæa*, of which I have even smaller specimens than 5.5 mm. in length.

Strigoderma viridicollis, new species.

Form of *arboricola*, head, thorax and scutellum bright green, thorax with pale side margin, legs pale with greenish luster. Head coarsely and densely punctate, clypeal margin obliterated; clypeus moderately reflexed. Thorax not quite twice as wide at base as long; sides feebly arcuate; apical angles subacute, basal angles rounded; surface coarsely punctate, densely at sides, slightly more sparsely on the disk, intermixed with a few finer punctures, pubescence moderately long, erect; at sides two oblique impressions, one starting from near the apical angles and the other below this, median line impressed but not reaching base or apex. Scutellum irregularly punctate, punctures finer than those on thorax. Elytra one and a half times as long as wide at base, feebly arcuately narrowing to apex; surface striate-sulcate, punctures of striæ large and shallow; intervals very convex, as wide as the striæ. Pygidium transversely rugose, sparsely hairy. Front tibiæ bidentate; front and middle outer claw cleft, the upper part much narrower and slightly shorter than the lower. Metasternum coarsely punctate; abdominal segments more finely and sparsely. Length 9 mm.

New Mexico.

I received this as a new species, a few years ago, from Mr. E. A. Schwarz.

This species, of which I have seen only males, looks very distinct from *arboricola*, but I am unable to point out a good character to separate the two, except the color, which, according to a note made at that time, is constant. It is possible that Casey's *pimalis*, which I do not know, connects the two. The color is pale testaceous, the underside, the front and middle femora entirely, and the lower half of hind femora bluish black; the pygidium, tarsi and upper half of hind femora testaceous with greenish luster; the suture greenish, a few of the costæ at sides and antennæ piceous; the head, thorax and scutellum are bright-green, but not as shining as in *arboricola*. The hind tarsal joints are slightly shorter and a little broader than those of *arboricola*.

TABLE OF THE SPECIES OF STRIGODERMA.

1. Front tibiæ dentate, head coarsely rugosely punctate.................................. 2.
   Front tibiæ not dentate, head sparsely punctate (size 4 mm)......**exigua** Schwz.
2. Hind tibiæ short and broad, about twice as long as wide at apex; upper tooth of front tibiæ large; color variable, head and thorax cupreous or æneous, with or without pale side margin, elytra dark brown to pale testaceous, in the latter the side margin often more or less dark.......... ....**latitibia** n. sp.
   Hind tibiæ three times or more as long as wide at apex............................ 3.
3. Elytra with four or five distinct, more or less entire striæ, those at sides confused, never distinct; color æneous or cupreous, elytra pale, with scutellar spot, an oblique median band on each side of middle and apex black, or black, with circumscutellar spot and a few spots at apical third pale (size 5–5.6 mm.). **pygmæa** Fab.
   Elytra with all the striæ distinct and entire, the umbonal striæ sometimes confused by a row of coarser punctures, the submarginal striæ always distinct, entire and deeply impressed (size 8 mm. or more).................................. 4.
4. Head thorax and scutellum bright green, side margin of thorax pale, feebly shining, elytra testaceous with suture greenish and a few of the intervals at sides blackish..**viridicollis** n. sp.
   Head and thorax bluish-black or dull green, shining; thorax more or less pale or cupreous or æneous at sides; elytra testaceous, some of the intervals at sides and suture more or less infuscated, sometimes all the intervals blackish. **arboricola** Fab.

Euphoria arizonica, new species.

Black, abdomen, legs, antennæ and pygidium reddish; thorax, scutellum and elytra opaque, fulvous, the former with a broad, black longitudinal mark on each side of middle, elytra with suture, margins and a few irregular spots on the disk black. Head and clypeus coarsely and densely punctate and with rather dense pale pubescence; clypeus as long as wide, slightly widening towards apex, side margins thickened, apex reflexed, emarginate at middle, angles rounded; antennal club as long as the preceding seven joints together. Thorax as wide at base as long, arcuate slightly before middle, obliquely narrowing to apex, feebly diverging to base; hind angles rounded, base slightly arcuate, emarginate-truncate at middle; surface rather sparsely and finely punctate on the disk, slightly denser at sides, each puncture bearing a short pale hair. Scutellum impunctate. Elytra one and a half times as long as wide at base; feebly costate and rather sparsely punctate, each puncture bearing a short pale hair. Pygidium feebly convex, rugose and rather densely clothed with pale hairs. Front tibiæ bidentate, the upper tooth very feeble. Metastermum at sides and femora rather densely clothed with cinereous hairs, tibiæ and abdomen more sparsely, the latter rather sparsely punctate. Length 13 mm.

Huachuca Mts., Arizona.

By description the Mexican *fulveola* must be very near *arizonica*, but the former has the tibiæ acutely tridentate, while in *arizonica* th are bidentate, with the second tooth very feeble and alike in the s specimens (all males), which I have seen. The specimens, wh taken, were by no means old and worn, but were all fresh and look as if they had just emerged. Each of the two black thoracic marks *fulveola* is divided behind middle, while in *arizonica* they are entir but specimens of the former will undoubtedly occur in which they a also entire.

Euphoria leucographa var. **rufina Gory & Perch.**
Monog. Cet., p. 206, tab. 37, fig. 5.

I mention this species here as there seems to be a mistake ma somewhere. Professor Snow recently sent me a few specimens of wh I had considered to be the above species, under the name *subtomento* var. *histrionella*. In calling his attention to the possibly wrong iden fication, he wrote me that the species was identified for him by M Liebeck and that the species stands under that name in the Horn colle tion, which was also told me by Dr. Skinner. Mr. Blanchard,* wl mentioned the occurrence of these two species in Arizona at the su gestion of Dr. Horn and who undoubtedly had seen or received so of Horn's specimens, gave a short description of each of these speci but they do not agree with Dr. Horn's specimens as they now sta in his collection. From Burmeister's descriptions † and Bates remarks however, there is no doubt that Mr. Blanchard's description refers the right species. Burmeister separates *leucographa* from *rufina* by t blackish æneous color, clypeus deeply emarginate and the anten club nearly as long as the head; the latter is said to be shorter th the head in *rufina*, in which the clypeus is not emarginate and the col cupreo-fuscous. The difference in the length of the antennal club sexual, the emargination of the clypeus and the color are variable, shown by Bates and which can be observed also in the Arizona spe mens, where, however, the blackish æneous specimens do not seem occur. The Arizona specimens are reddish, with slight æneous ti thorax with more or less distinct, black, longitudinal marks on ea side of middle; elytra similarly marked with white spots as in *mela cholica*, the disk sometimes more or less blackish. From what I cou gather from the descriptions and remarks by Burmeister and Bates *leucographa* and *rufina* are the two extremes of one species, though Bates referred the northern specimens with black marks on thorax also to *rufina*, whether they have the clypeus emarginate or not.

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* Trans. Am. Ent. Soc., vol. XII, p. 172.

† Biol. Cent. Am. Coleop., vol. II, pt. 2, p. 364.

‡ Handb. d. Entomologie, vol. III, p. 375.

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NEW RHYNCHOPHORA.—II.

By CHAS. SCHAEFFER,

BROOKLYN, N. Y.

Otidocephalus basalis, new species.

Head black, coarsely punctate, sparsely clothed with white recumbent setæ, foveate between the eyes, the latter separated by about half of their own width; beak short, robust, bistriate on each side, the discal striæ reaching to apex, the lateral striæ shorter, disk with an elongate, shallow fovea near apex, the latter coarsely, but not densely punctate; antennæ reddish, club piceous, elongate-oval. Thorax black, convex, sides feebly arcuate; disk densely and coarsely punctate, a smooth, narrow median line distinct; surface with moderately abundant white and dark setæ, the latter less numerous than the white and all directed towards apex. Scutellum densely clothed with white pubescence. Elytra black, basal third red, more than twice as long as wide at base; humeri oblique; sides gradually widening towards apical third, thence arcuately narrowing to apex; disk with regular rows of large, deep and closely placed punctures; intervals feebly convex, each with an irregular row of smaller punctures; surface not densely clothed with recumbent, white, coarser setæ, sparsely intermixed with a few erect finer, darker setæ, the white setæ more abundant at apical third, than on the disk. Underside and legs black, clothed with recumbent white setæ; prothorax beneath, mesosternum and metasternum with radiate-pectinate hairs; femora with a small tooth, front tibiæ slightly sinuate within. Length 4.5 mm.

Huachuca Mts., Arizona.

In form and vestiture this species resembles closely *estriatus* Casey, which also occurs in the same region, but the well defined rows of punctures and the red basal space readily separate the two.

I have one specimen from Senator, Arizona, which differs from typical *estriatus* in having the intervals of elytra densely punctate and the white hairs more abundant. This gives the specimen the appearance of a different species, but there is otherwise no difference and the punctuation is variable in the specimens of *estriatus* before me.

Otidocephalus subglaber, new species.

Head black, nearly smooth, foveate between the eyes; the latter separated by about half of their own width; beak short, stout, smooth at middle, punctate at apex, at sides narrowiy striate, sides with a few, short white hairs, which are denser around the eyes; antennæ reddish, club piceous. Thorax rather strongly declivous in front and feebly impressed; sides feebly arcuate, towards base feebly constricted; disk very sparsely punctate with widely scattered punctures, each bearing a coarse white hair. Scutellum very small, densely clothed with white pubescence. Elytra black, slightly longer than twice as wide at base; humeri rounded; sides gradually widening towards apex; surface with regular rows of coarse, deep and closely placed punctures, the three inner rows impressed; intervals convex, with a row of widely placed smaller punctures, each bearing a single coarse, recumbent white, or erect finer, dark hair. Underside and legs black; clothed with finer white hairs; femora with a small tooth; front tibiæ narrow, slightly sinuate within. Length 3.5 mm.

Arizona (Dietz).

The very sparsely placed white coarse, and finer dark hairs of elytra, together with the impressed elytral striæ, the form of thorax and the interocular fovea readily distinguish this species.

Otidocephalus arizonicus, new species.

Head black, coarsely, densely punctate, black setæ erect, white setæ sparse, short, recumbent, more dense and longer between the eyes; the latter separated by about half their own width; beak about as long as the thorax, stout, bistriate on each side, striæ impressed and rather coarsely punctate, discal striæ extending to about basal half, lateral striæ extending to apex, surface at apex irregularly punctate; antennæ reddish, club piceous, first joint of funiculus stout and as long as second and third together, club elongate-oval. Thorax convex; sides arcuate, feebly constricted at base; disk closely and rather coarsely punctate, median smooth line not clearly defined; surface with numerous, erect, white and black setæ, the white denser at middle of apex; at base and sides a few radiate-pectinate white hairs. Scutellum densely covered with white pubescence. Elytra black, more than twice as long as wide; humeri broadly rounded; sides slightly widening to apical third; disk with rows of deeply impressed, coarse and closely placed punctures; intervals narrow with a row of irregularly placed finer punctures; surface with rather abundant white and black setæ, the former more numerous and slightly shorter than the black. Underside of body black, moderately clothed with erect white setæ; prosternum, mesosternum and sides of metasternum densely clothed with radiate-pectinate hairs. Legs black, densely-clothed with erect and semi-erect white setæ, intermixed with longer, black setæ; femora armed with a large triangular tooth, front tibiæ slightly sinuate within, the broadest part at about middle. Length 5.25 mm.

Huachuca Mts., Arizona.

In general form and size of the femoral tooth, this species is nearest *myrmex* Herbst, but the front tibiæ are longer with the broadest part medially, the thorax more closely and coarsely punctate and the white setæ are abundant on thorax and elytra and distributed nearly evenly over the entire surface of the latter. In well preserved examples radiate-pectinate hairs are present at base and sides of prothorax and around the scutellum.

By description this species seems to be related to the Mexican *hystricosus* and *setiger;* from the former the larger femoral tooth separates it and from the latter the more abundant white setæ, which are described in *setiger* as coarse white hairs. The anterior tibiæ are also in *arizonicus* not strongly sinuate within.

Otidocephalus texanus, new species.

Head black, moderately coarsely and not densely punctate; foveate between the eyes; the latter separated by half of their own width; beak slightly shorter than the thorax dorsally, coarsely punctate-striate at sides, slightly curved, punctate at apex; antennæ reddish, second joint of funicle longer than third, third, fourth, fifth and sixth equal in size, club piceous, nearly as long as the preceding five joints. Thorax slightly convex; sides feebly arcuate; disk very sparsely punctate and with a few erect black setæ; scutellum densely clothed with white pubescence. Elytra elongate oval; humeri obliquely rounded; sides gradually widening to about apical third; surface with regular rows of moderate, not deeply impressed punctures; intervals wide, almost smooth, with a few dark setæ and near apex a few white setæ. Underside and legs black, with sparse white, fine hairs; sides of metastermum densely clothed with radiate-pectinate hairs; femora elongate, armed with broad triangular tooth; front tibiæ feebly sinuate within. Length 5 mm.

Brownsville, Texas.

The form of thorax and antennal club, the frontal fovea and feeble punctuation of elytra distinguish this species.

Otidocephalus coræ Champ.

Biol. Cent. Am., vol. IV, pt. 4, p. 262.

Specimens which agree fairly with the description of this species have been taken from oak in the Huachuca Mts., Arizona.

This species is closely allied to *scrobicollis*, but is generally a little larger, with much more abundant black and white, erect setæ on thorax and elytra and the series of large punctures on elytra are distinctly impressed. The black and white setæ in this species are even slightly more numerous than in *arizonicus*, which it resembles very closely in form and size, but *coræ* has only a small femoral tooth.

In the following synoptic table, as well as in the descriptions, I have used Mr. Champion's term "radiate-pectinate" for those peculiar white or pale hairs of certain species, which are three or four branched. I think that this term conveys the peculiar structure of these hairs better than Dr. Horn's term "tufted."

A few of our species I have not seen; of these, the characters used in the table, are taken from the descriptions.

Otidocephalus poeyi Chev. is unknown to me. It is a Cuban insect, found in Florida and it is possible that *cavirostris* and *poeyi* are the same.

Otidocephalus perforatus Horn, is not included in the table. Major Casey erected for this species the genus *Oopterinus*, which was rejected by Dr. Horn, but accepted by Champion in the "Biologia," who added several species from Mexico and Guatemala. The species of this genus are principally distinguished by the ovate elytra, with the humeri obsolete, otherwise they do not seem to differ from *Otidocephalus* except that the species are apterous.

TABLE OF THE SPECIES OF OTIDOCEPHALUS.

1. Femora dentate; beak in both sexes without large, dorsal excavation at middle. 2.
Femora not dentate; beak in the male with a large and deep dorsal excavation near middle .... 24.
2. Elytra with recumbent or subrecumbent radiate-pectinate hairs and with erect setæ .... 3.
The hairs on elytra simple, not radiate-pectinate, except in well preserved examples of *arizonicus*, where a few radiate-pectinate hairs may be present near the scutellum and base of thorax .... 7.
3. Pubescence of alternate elytral intervals sparse or absent .... 4.
Pubescence of all the intervals uniform; in *insignis* the intervals are narrowly denuded on each side of the rows of punctures .... 5.
4. The glabrous elytral intervals with a few widely separated punctures. **vittatus** Horn.
The subglabrous intervals confusedly and somewhat densely punctured. **nivosus** Casey.
5. Erect setæ on elytra black; pubescence uniform in color, pale brownish-cinereous, dense on the elytral intervals, but denuded in a narrow space on each side of the series of punctures, producing a multivittate appearance. **insignis** Casey.
Erect setæ on elytra white .... 6.
6. Beak sparsely punctate at tip, obtusely carinate; pubescence of elytra paler along suture, at sides and middle of thorax .... **ulkei** Horn.
Beak coarsely punctate, smooth at middle in front, not carinate; pubescence unicolorous .... **sparsus** Horn.
7. Elytral series of punctures distinct, intervals very sparsely punctate .... 9.
Elytral series of punctures more or less confused by the irregular punctuation of the intervals .... 8.

8. Pubescence of elytra uniformly gray, recumbent, without darker setæ; form elongate **uniformis** Champ.

Pubescence of elytra white, recumbent, with darker, erect setæ intermixed. **estriatus** Casey.

9. Elytral intervals two, four, six and eight moderately densely pubescent with grey hairs, the others naked and sparsely biseriately punctate, each puncture with a hair...**alternatus** Horn.

All the elytral intervals uniformly pubescent.. 10.

10. Median line of thorax distinctly carinate from base two thirds to apex; elytra clothed with greyish pubescence, the latter leaving some smooth spaces, intervals with semi-erect black setæ; femora with a small tooth; color dark bronze. **carinicollis** Horn.

Median line of thorax not carinate; a narrow smooth median line is present in *basalis* and faintly indicated in some specimens of *scrobicollis*, but is not elevated into a carina.. 11.

11. Elytra without erect setæ; color ferruginous, apical half or more of elytra black, very sparsely clothed with very narrow, recumbent, white, scale like hairs; head between the eyes with an elongate fovea; claws not toothed, but thickened towards base...**dichrous** Lec.

Elytra with erect or semi-erect setæ.. 12.

12. Color of elytra uniformly black.. 13.

Elytra black, basal third or more bright red, the rows of punctures coarse and deep, intervals sparsely punctate with recumbent white, scale-like hairs, intermixed with sparser, erect, black setæ; femoral tooth small........**basalis** n. sp.

13. Elytra with recumbent, sparsely and very remotely placed narrow, scale-like, white hairs, intermixed with a very few longer, erect, black setæ; coarsely punctate-striate, the first three striæ somewhat deeply impressed, intervals subconvex and very sparsely and remotely punctate; head and thorax very sparsely punctate, almost smooth, the former between the eyes with a distinct, but not deeply impressed elongate fovea, femoral tooth small...........**subglaber** n. sp.

Elytra with erect or partly semi-erect pale and dark pubescence............... 14.

14. Femoral tooth large triangular.. 15.

Femoral tooth small, narrow.. 20.

15. Punctuation on the disk of thorax coarse and dense, the punctures separated by at most their own diameter; black and white pubescence on head and thorax abundant, long and erect, the white slightly shorter and suberect on the disk. **arizonicus** n. sp.

The punctures on thorax not densely placed, disk with some larger smooth spaces. 16.

16. Elytra with robust white, and finer longer, piceous setæ.......................... 17.

The white setæ almost entirely absent from the disk, visible at sides and apex of elytra and scarcely more robust than the black setæ.............................. 18.

17. The white setæ on elytra recurved, striæ broadly, rather strongly impressed, coarsely, deeply, not very closely punctate..........................**egregius** Casey.

The white setæ on elytra erect; elytra with very feebly impressed series of rather coarse, deep, somewhat distant punctures.........................**floridanus** Casey.

18. Front tibiæ stout, distinctly sinuate within, the broadest part nearer the apex than middle; elytra with series of deeply impressed and closely placed punctures. **myrmex** Herbst.
Front tibiæ rather slender, feebly sinuate within, the broadest part about middle.......... 19.
19. Antennal club oval, as long as the three preceding joints together; thorax convex; punctures of elytral series deeply impressed, those of the intervals distinct, remote and slightly smaller than those of the regular series. **ruficornis** Casey.
Antennal club elongate-oval, pointed at apex, nearly as long as the preceding five joints together; punctures of elytral series feebly impressed, those of the intervals extremely fine and almost absent..........**texanus** n. sp.
20. Eyes separated by much less than half of their own width.......... 23.
Eyes widely separated.......... 21.
21. Head with a few, sparse punctures; between the eyes a large, elongate fovea; elytral setæ very few and short; front femora elongate; elytra strongly widening behind..........**chevrolatii** Horn.
Head closely and coarsely punctate, without fovea between the eyes; elytral setæ long and abundant, front femora clavate near apex, elytra feebly widening behind.......... 22.
22. Elytral series of punctures distinctly impressed..........**coræ** Champ.
Elytral series of punctures not impressed on the disk..........**scrobicollis** Boh.
23. Elytra with a few moderately long, very sparsely placed white setæ on the alternate intervals, except at apex; the rows of punctures not impressed. **lævicollis** Horn.
Elytra with long, sparsely placed, white setæ on all the intervals; the rows of punctures visibly impressed..........**speculator** Casey.
24. Very small, elytra distinctly punctate-striate, intervals flat, almost smooth, each interval with only a very few erect, white hairs..........**cavirostris** Casey.

NEW GENERA AND SPECIES OF NORTH AMERICAN CERAMBYCIDÆ.

By H. C. Fall,

Pasadena, Cal.

During the past few years isolated descriptions of a number of new species of longicorns have been drawn up by the writer, and it is thought best to bring these together in a short paper at this time.

It is believed that the species are all sufficiently distinct to warrant this procedure.

Neoclytus modestus, new species.

Piceous, legs brownish, antennæ dark rufous; pubescence of upper surface dark brown, suffused almost throughout with white hairs, which are sparser and less conspicuous posteriorly. Anterior and middle elytral bands reduced to a sutural spot, the latter often entirely lacking; posterior band very narrow, directed obliquely backward from the suture, then curved forward exteriorly; this also sometimes reduced to a sutural spot. Antennæ slightly longer than half the body (♂), shorter than half the body (♀); head hoary, densely punctate. Prothorax slightly longer than wide, without markings, the white hairs denser along the basal margin; discal asperities small, not confined to the median line. Elytra narrowed posteriorly, scutellum and basal margin rather densely suffused with white; markings of same color; apex obliquely truncate and acuminate. Beneath with white pubescence which is condensed at the posterior margins of the meso- and metasternal episterna; abdomen uniformly sparsely pubescent. Hind thighs not spinose at apex. Length 9–12 mm.

California (Pasadena and Kaweah); collections of Dr. Fenyes, Mr. Hopping and the author.

Rather closely allied to the eastern *longipes*, but differs in its less elongate prothorax, normally reduced markings and uniformly pubescent abdomen.

Neoclytus carus, new species.

Black, prothorax with a straight, median, transverse, pale yellow fascia which is interrupted at middle; the basal margin also narrowly pale. Scutellum densely pale pubescent, base of elytra narrowly suffused with yellowish white hairs, and with three sharply defined pale fasciæ as follows. First fascia at about the basal fourth, a little oblique, nearly straight, slightly narrowed at the middle of its length; median fascia lunate, convex posteriorly, a little more advanced at the suture than exteriorly; third fascia near apical fourth, very narrow, posteriorly oblique and slightly arcuate, apical margin with yellow hairs which extend narrowly along the suture but do not reach the posterior fascia. Beneath with the usual meso- and metepisternal spots, the former whitish, the latter yellow; abdomen with segments 1–4 m. margined with yellow posteriorly. Antennæ scarcely half the length of the body (♀). Prothorax slightly elongate, with both median and lateral asperities. Elytra obliquely truncate, the sutural and outer angles slightly prominent. Posterior femora rather feebly clavate, not spinose at tip, hind tibiæ straight and very little widened apically. Length 9–11 mm.

Southern California (Mountains near Pasadena).

Two examples only of this very pretty species have been seen. The type was taken by the writer in June at an elevation of about 3,000 ft. A second example in Dr. Fenyes' collection is labeled "Mt. Lowe," elevation not indicated.

This species would perhaps best follow *muricatulus* as our species are at present arranged, but is not very closely related to any.

Neoclytus tenuiscriptus, new species.

Red-brown, scutellum and three elytral fasciæ yellow. First two fasciæ ver narrow and approximate, the first a little oblique, nearly straight and of unifor width, bent forward a little at its outer end which is nearly perpendicular to the sid margin; second fascia rather strongly anteriorly angulate near the suture, its oute portion strongly oblique and slightly arcuate; posterior fascia just behind the apica fourth, wider than the others, of nearly equal width, oblique, and straight or slightl posteriorly arcuate. Beneath thinly pubescent, lateral episternal spots as usual, hin margin of metasternum and of first ventral segment narrowly yellow; second ventral more broadly margined with yellow especially externally. Prothoracic rugæ mainly confined to the median line, though with traces of lateral elevations in mos examples. Thighs strongly pedunculate, hind tibiæ strongly compressed and moderately dilated apically, femora not distinctly spinose at tip. Length 10–12½ mm.

Southern California (Pasadena; Claremont).

Quite closely related to *approximatus*, in which however the elytra bands are wider, especially the anterior and posterior ones near th suture, and the spacing is also a little different. The elytral apic are obliquely truncate in both species but a little more widely so i *approximatus*.

Eudistenia, new genus.

Elongate, subcylindrical; palpi not very unequal, terminal joints longer than wide, moderately dilated, truncate; eyes moderately granulated, almost completely divided, the upper lobe small. Antennæ very slender, much longer than the body in the ♂, equal in length to the body in the ♀, not compressed, neither spined nor tuberculate, sparsely hairy beneath, second joint very short, outer joints decreasing in length. Prothorax a little wider than long, rather strongly constricted at base, sides obtusely tuberculate posteriorly. Scutellum obtusely triangular, elytral apices separately rounded. Prosternal process rather narrow but distinctly separating the coxæ, which are rounded and moderately prominent; front and middle coxal cavities angulate externally; metasternal episterna narrow, not much wider in front. Legs moderate, thighs not strongly clavate, tibial spurs short.

This genus is founded on a fine large Californian species whose immediate affinities are not entirely clear. There can be little doubt that it should be placed in the Cerambycini though the eyes are less coarsely granulate than is the rule in this tribe. The ligula is apparently corneous, at least in part, and is broadly rather deeply emarginate. This together with the distinctly visible front trochantins throw it into the group *Œmes*, with the members of which it agrees in the aggregate quite as well as they agree with one another, departing from the majority of them in the narrow more parallel metasternal episterna, less unequal palpi and style of punctuation, which latter is of the type prevailing in *Brothylus*.

Eudistenia costipennis, new species.

Subparallel, dorsum of elytra moderately flattened, pubescence short, recumbent, moderately dense, ochreo-cinereous, elytra with three strongly angulate narrow blackish brown fasciæ, the subapical one less distinctly defined. Head and prothorax finely punctulato-rugose, the latter with an anterior transverse series of four feebly defined tubercles, two discal the others lateral, and with a better marked but obtuse posterior lateral tubercle, behind which the thorax is cylindrically constricted. Elytra a little wider than the thorax, humeri rectangular and narrowly rounded, each with two entire costæ and a short basal inner one, the suture also a little elevated, surface sculpture apparently like that of the head and thorax but more completely concealed by the pubescence except for numerous larger nude punctures irregularly scattered over the surface. Beneath finely punctate and cinereous pubescent. Length 17-23 mm.

Southern California.

Five examples taken by Dr. Fenyes and the writer near the summit of the Sierra Madre mountains above Pasadena, and one example from mountains near Claremont (Baker). One specimen was beaten from live oak, in which the insect probably breeds.

This species bears a somewhat striking superficial resemblance in size and markings to *Distenia undata.*

Aside from the disparity in length of antennæ there is apparently little sexual difference. The fifth ventral is subequal in length to the fourth and rounded at apex in both sexes, but more broadly so in the male.

Leptostytus yuccivorus, new species.

Piceous, clothed rather densely throughout with short, appressed, cinereous pubescence mingled on the elytra with very short erect pale hairs which are inconspicuous except in profile. Antennæ subequal in length to the body, only slightly longer in the male. Prothorax transverse, obtusely tuberculate at sides, the apex of the tubercle just behind the middle; disk with an elongate median callosity in posterior half and two rounded anterior ones, all feebly elevated and nearly smooth; disk otherwise uniformly moderately closely but not coarsely punctate; pubescence uniformly cinereous except for two apical and two basal spots in the form of a square; flanks sparsely punctate, nearly smooth at middle. Elytra nearly twice as long as wide, about one half wider than the prothorax and nearly five times as long, disk entirely devoid of tubercles or tufts of hair but with three smooth obtuse and slightly elevated longitudinal lines which vary a little in distinctness; pubescence cinereous with more or less evident blackish vittæ toward the side and apex. The raised lines are frequently a little paler than the rest of the surface, the pubescence taking on in consequence an ochreous tint which alternates with the darker vittæ; punctuation dense and rather coarse at base, finer apically; apices not at all truncate. Beneath minutely densely punctulate and uniformly cinereous pubescent; tibiæ feebly annulate, intercoxal process of prosternum narrower than the width of the coxal cavity. Length 13 mm.

Numerous examples taken by Professor Snow at San Bernardino Ranch, Douglas, Arizona, where they were found breeding in stems of yucca. Rather larger than any other species of our fauna; by the latest table it would stand near *perplexus*.

Liopus decorus, new species.

Not very robust, densely clothed with short prostrate cinereous hair, maculate with black as follows: prothorax with two round anterior spots and the median line posteriorly, these usually more or less coalescent and diffuse; elytra with a rather large lateral spot just before the middle, and at the posterior third a common more or less evidently angulate fascia which is more or less irregular and is usually broken up externally into small black spots; there are also small black spots scattered over the surface, those at the middle sometimes imperfectly continuing the median lateral spot to the suture. Punctuation well developed throughout, erect tufts of setæ entirely wanting. Lateral spine of prothorax at the posterior third or fourth. Length 5–6 mm., width 1.8–2.3 mm.

Williams, Arizona. July. Collected by Schwarz and Barber and by the writer.

A very pretty species, which Mr. Schwarz has referred to *centralis* Lec. The latter, however, is more robust, somewhat differently marked, the prothoracic spine is said to be just behind the middle, and the elytra bear small tufts of black scales.

Ataxia sulcata, new species.

Dark brown, nearly parallel, sparsely pubescent with brownish ochreous hairs, with a few white hairs intermixed. Head finely densely punctulate, with scattered coarser punctures. Antennæ (♀) scarcely as long as the body, feebly annulate externally. Prothorax about as long as wide, base evidently wider than the apex, sides broadly arcuate and rather feebly tuberculate at middle, base with a marginal impressed line, disk closely punctate, median line plainly carinate anteriorly in some examples, scarcely so in others. Elytra nearly parallel, broadly rounded and scarcely truncate at apex, each with five or six discal sulci which are gradually shallower externally; sides not sulcate; punctures arranged in nearly regular rows, each having a short semi-erect hair; pubescence otherwise very short and recumbent. Length 12–15 mm.

Florida (Key Largo).

Two examples, both apparently females, received from Mr. Beyer. Distinguishable at once from our other species by the sulcate elytra and very sparse pubescence.

Ataxia setulosa new species.

Rather slender, parallel, very densely clothed with recumbent ochreous hair, with the usual fine suberect setæ arising from the elytral punctures darker in color; elytra also with numerous setiform fascicules each consisting of from three to six white hairs. Antennæ slightly longer than the body (♂), very feebly annulate externally. Prothorax cylindrical, slightly longer than wide, sides straight, strongly tuberculate just before the middle, base and apex nearly equal in width, disk obtusely tuberculate, each side before the middle, median line finely carinate in front and with a narrow line of white hairs in its posterior third. Scutellum white. Elytra parallel, not sulcate, sparsely punctured in series, the sculpture however nearly concealed by the dense vestiture, apex obliquely truncate internally. Length 10–12 mm.

Santa Rosa, Lower California (Beyer).

Unique among our species in the character of the elytral vestiture.

Our four species of *Ataxia* separate as follows:

Elytral apices spinose [Southern Florida and Cuba]................**spinicauda** Schaef.
Elytral apices rounded or more or less obliquely truncate.
    Elytral disk distinctly sulcate, vestiture very sparse [Southern Florida].
        sulcata n. sp.
    Elytral disk not sulcate, vestiture dense.
        Elytra without fascicules of white hair; antennæ distinctly annulate [Pennsylvania to New Mexico]..**crypta** Say.
        Elytra with setiform fascicules of white hairs; antennæ feebly or scarcely annulate [Lower California] ....**setulosa** n. sp.

A specimen collected at Cayamas, Cuba, by Mr. Schwarz has been sent me with the label *spinipennis* Chev. attached. This is precisely like a typical example of *spinicauda* received from Mr. Schaeffer. If the Cuban specimen is really Chevrolat's species, *spinicauda* becomes a synonym, but as Mr. Schaeffer remarks, the specimens do not agree very well with Chevrolat's description, and such action is not yet warranted.

Lianema, new genus.

Very slender, cylindrical. Palpi short and unequal but similar in form, the last joint a little dilated and narrowly obliquely truncate at apex. Antennæ exceedingly slender, fully twice as long as the body, nearly invisibly pubescent; first joint about as long as the head, gradually widened, without apical spine; second joint as long as wide and about one fourth the length of the third; joints 3–6 increasing in length, the third scarcely as long as the first, the sixth about twice the length of the first; 6–10 subequal; eleventh nearly as long as the four preceding. Eyes moderately coarsely granulate, deeply emarginate, upper lobe relatively small, separated both above and beneath by a distance equal to half the apical width of the prothorax. Front nearly flat, rather deeply impressed or concave just behind the labrum. Prothorax much longer than wide, cylindrical, slightly dilated before the base, broadly feebly constricted behind the apex, base broadly emarginate from side to side, apex truncate. Elytra subparallel, slightly wider than and more than twice as long as the prothorax, evidently shorter than the abdomen. Prosternum very long before the coxæ, the intercoxal process nearly flat and about half as wide as the coxa; cavities open behind and angulate externally. Middle coxæ a little more distant than the front ones, mesosternum acutely triangular, metasternum very long; ventral segments subequal, the fifth elongate, narrowly rounded and feebly emarginate posteriorly. Thighs clavate, tibiæ linear, not grooved within; tarsi very slender, subequal in length to the tibiæ, first joint almost as long as the remainder, last joint nearly equal to the two preceding; claws divaricate, dilated a little at base.

This genus is founded on a peculiar little species from Lower California. It must evidently be classed with the Methiini but is remarkably distinct from all our previously established genera in its very long tarsi and rather widely separated front and middle coxæ. It may be placed before *Idæmea*.

The type species requires but a short description in addition to the above diagnosis.

Lianema tenuicornis, new species.

Linear, uniformly dark brownish testaceous, very finely and sparsely pubescent, dull. Prothorax alutaceous and finely not closely punctulate, disk before the middle with a minute dentiform tubercle each side the median line. Elytra closely, finely, indistinctly punctulate. Prosternum feebly transversely wrinkled, smooth and shining in front, alutaceous behind, with scattered rather course punctures throughout. Abdomen moderately shining and sparsely punctured. Length 5 mm.

Lower California (El Taste).

A single example, probably a male, collected by Mr. Beyer.

Methia æstiva, new species.

Piceo-testaceous, the elytra with more or less defined alternating pale and dark vittæ in fully colored examples; surface dull, finely punctate and moderately pubescent; legs and antennæ hairy. Antennæ much longer than the body in both sexes, second joint very small, button-like, but quite distinct; joints 3–11 slightly decreasing in length. Eyes very large, subcontiguous on the vertex, almost divided. Prothorax as wide as long, scarcely or but very feebly constricted at base and apex, sides moderately arcuate; disk in front with a faint callosity each side the median line. Elytra a little shorter than the abdomen, nearly parallel in the female, a little shorter and evidently narrowed behind in the male, tips a little dehiscent and separately rounded; beneath more shining and with the abdomen less finely and more sparsely punctate than above; thighs not clavate, front tibiæ evidently obliquely grooved within, first tarsal joint subequal to the last, each about as long as the second and third united. Length 5–8½ mm.

Pasadena, California. Attracted to electric lights in August and September.

This species, like the *mormona* of Linell, differs from *Methia* as defined by LeConte in its visible second antennal joint, but seems best referred here for the present. It differs from *mormona* in its smaller size and different coloration, and in the elytra being shorter than the abdomen (though not very much so) nearly as in typical *Methia*. The fifth ventral in the female is broad, pale in color, triangularly emarginate from side to side, the emargination fringed with capitate hairs in addition to the usual pubescence. In the male the fifth ventral is also broadly though less triangularly emarginate, the following segments visible in and behind the emargination, the pubescence of the usual form.

◆

Class I, HEXAPODA.

Order IV, DIPTERA.

A PRELIMINARY LIST OF NEBRASKA SYRPHIDÆ WITH DESCRIPTIONS OF NEW SPECIES.

By Paul R. Jones,
Lincoln, Nebraska.

In making this list of the Nebraska Syrphidæ the writer has examined and included all published records, and determined the collection of the University of Nebraska. I desire to thank Mr. Myron H. Swenk for his criticism and valuable suggestions, and Dr. S. W. Williston for kindly verifying some of my determinations.

1. MICRODON Meigen.

1. Microdon coarctatus Loew.

Three males from Sioux County, Nebraska. Formerly recorded from District of Columbia, Mexico and Florida.

2. Microdon lanceolatus Adams.

♀. Length 11 mm. Head black, subfulgent, covered with yellowish white pile, eyes bare. Antennæ black, first joint a trifle longer than the second and third together, second joint nearly two thirds as long as third joint, third when viewed from side lanceolate as in the male, and subconical when viewed from above; arista basal, bare, a little longer than the third joint, yellowish, darker at the base. Face black, subfulgent, coarsely and sparsely punctured, pile lighter. Thorax black, subfulgent, mesonotum and scutellum thickly yellowish white pilose, pleura more sparsely so, scutellum without spines. Thorax and scutellum more finely punctate than the face. Abdomen black, finely punctate, black pilose except second segment and lateral borders of all the segments which are yellowish-white pilose. Legs black, black pilose except the under side which is yellow pilose, pulvilli yellow. Wings lightly infuscated, veins black.

One female, War Bonnet Cañon, Sioux County, Nebraska, altitude 5,000 feet (M. A. Carriker). Formerly recorded from a male taken at Englewood, Kansas, from the description of which the above shows some variation.

3. **Microdon tristis Loew.**

A female from West Point, Nebraska, June 27, 1906 (P. R. Jones), and a male and female from Halsey, Nebraska, June 1, 1906 (L. Bruner). The specimen from West Point agrees with Williston's description of the variety *ruficrus*.

2. CHRYSOTOXUM Meigen.

1. **Chrysotoxum derivatum Walker.**

Specimens from West Point, Nebraska and Glen, Sioux County, Nebraska.

2. **Chrysotoxum pubescens Loew.**

One male from Lincoln, Nebraska.

3. CHRYSOGASTER Meigen.

1. **Chrysogaster lata Loew.**

A male and female taken at Bad Lands, mouth of Monroe Cañon, Sioux County, Nebraska, May 28, 1901, on *Astragalus* (L. Bruner).

Shining bronze-black, everywhere with short whitish pile. A silvery white cross band on the upper part of the face below the antennæ, narrower in the middle so that there appears to be two triangles with their apices together. Legs wholly black. Wings sublutescent, slightly clouded below the stigma. The front is only lightly rugose on the sides, facial tubercle wanting and epistoma produced. The male which had not been taken heretofore is similar to the female except that it is smaller and the abdomen is not so wide.

Formerly recorded from British North America and Oregon.

2. **Chrysogaster nigripes Loew.**

One male from Cedar Bluffs, Nebraska.

Face is distinctly tuberculate, the epistoma more projecting than the description indicates, and the antennæ are darker. The face has a broad white dusted cross-band on the upper part just below the antennæ. Wings blackish, lighter toward the base.

Formerly recorded from New York, New Jersey, Connecticut, North Carolina and Quebec.

3. **Chrysogaster nitida Wiedemann.**

Specimens from Lincoln, Nebraska, and West Point, Nebraska.

4. **Chrysogaster pictipennis Loew.**

Specimens from Roca, Lincoln, Cedar Bluffs, West Point and Ashland, Nebraska. Our most common species of the genus.

4. PIPIZA Fallen.

1. **Pipiza femoralis Loew.**

One male from Roca, Nebraska, May, 1906 (P. R. Jones). It agrees completely with Loew's description except that the eyes and face are more pilose.

Formerly recorded from Illinois, Missouri, Pennsylvania, and Quebec.

2. **Pipiza festiva Meigen.**

Two females from Roca, Nebraska, May, 1906, on *Fragaria virginiana* (P. R. Jones).

Length 8 mm. Front and face long white pilose, black pilose [at the base of antennæ and ocelli. Antennæ brown, darker on apical part of third joint which is broad, and as Loew says trapezoidal. Abdomen shining bronze-black, second segment with two nearly quadrate sulphur-yellow spots. Legs yellow with black femora, tibiæ brown in the middle. Wings hyaline at the base, smoky on the outer half so that they appear to have a large brown spot below the stigma in the center of the wing.

This is the first definite record of this species being taken in the United States. Williston says in his monograph: "I give the description of this species, although it is not known for certain that it occurs in this country, it being given in Osten Sacken's catalogue, with the remark, 'or a species allied to it,' as occurring in Canada."

3. **Pipiza pisticoides Williston.**

A male from Lincoln, Nebraska, which coincides with Williston's description.

Formerly recorded from New Hampshire, Alaska, Maine, New York, Colorado and New Mexico.

5. PARAGUS Latreille.

1. **Paragus bicolor Fabricius**, var. **testaceus Meigen.**

Male specimens from Halsey, Cedar Bluffs, West Point and Lincoln, Nebraska.

I have one male from West Point, Nebraska, which I am unable to determine. It has the black median facial stripe which is characteristic of *P. tibialis*, but, like *P. bicolor*, it also has a narrow yellow border on the scutellum. The abdomen is devoid of any of the ed markings which appear on some varieties of *P. tibialis*, but it has ar u-ate, pilose spots like those found on some varieties of *P. bicolor*.

2. **Paragus tibialis Fallen**, var. **hæmorrhous Meigen.**

Two males from Lincoln, Nebraska.

Var.? Two males from Lincoln, Nebraska, with the fourth, fifth and sixth segments red. Var.? Four males from Lincoln, Carns, and Cedar Bluffs, Nebraska, with the fourth segment and the tip of he abdomen red.

6. CHILOSIA Meigen.

1. **Chilosia comosa Loew.**

One female from Sioux County, Nebraska. The face is deepl concave beneath the antennæ and the tubercle is prominent.

Formerly recorded from Colorado, English River, Winnipeg a n St. Hilaire, Quebec.

2. **Chilosia lævifrons, new species.**

♂. Length 7.65 mm. Greenish black, shining. Eyes bare, front slig t sulcate, black, -subfulgent, nearly as wide as in *C. tarda*, nearly bare, spar e punctured, and covered with very short, sparse, yellowish pile. Face black, shini n bare except a few short whitish hairs on the orbits, gently concave to the tube c which is more prominent than the antennal projection, a deeper concavity from t tubercle to the epistoma, lateral grooves long and deep. First antennal joint bla c second reddish brown, third red, subquadrate. Arista of third joint dark brown finely pubescent. Thorax and scutellum shining black with a decided greenish tin and covered with long yellowish pile, the pile on the scutellum being longer t h that on the thorax. Scutellum finely punctate and without bristly hairs. Abdo shining, greenish metallic, covered with long bright yellowish pile, longer on lateral borders, first segment shining, second opaque, third opaque except an anter lateral spot on each side, remaining segments shining. Legs black, tip of femo base and tip of tibiæ, metatarsi and first two joints of tarsi yellowish red. Wi cinereous hyaline tinged with brown from stigma toward the base and center, ve brown. Squama yellowish, yellow ciliate. Halteres brownish.

Type. — Roca, Nebraska, May 12, 1906, on *Fragaria virginia* (P. R. Jones), 1 ♂.

This species is closely allied to *C. tarda*, but can be separated its nearly bare front, color of the antennæ, shape of the third antenn joint, and larger size. The first two joints of the tarsi of *C. lævifro* are yellowish red while only the basal joints of *C. tarda* are red.

3. Chilosia punctulata Hunter.

Described by Hunter from two females from West Point, Nebraska, in Canada Ent., Vol. XXIX, p. 128.

7. CHALCOMYIA Williston.

1. Chalcomyia ærea Loew.

One female from Cedar Bluffs, Nebraska. Formerly recorded from Illinois and Virginia.

8. MYIOLEPTA Newman.

1. Myiolepta varipes Loew.

One male from Lincoln, Nebraska, which agrees with Loew's description except that the legs are more luteous than black. Formerly recorded from Washington, Virginia, California and Mt. Hood, Oregon.

9. BACCHA Fabricius.

1. Baccha clavata Fabricius.

Numerous specimens from Lincoln, Nebraska.

10. PLATYCHIRUS St. Fargeau et Serville.

1. Platychirus chætopodus Williston.

One male from Sioux Co., Nebraska, which answers to Williston's description except that the brown ring on the middle femora is wanting, and the yellow abdominal spots are larger.

2. Platychirus quadratus Say.

Specimens from Lincoln, and Glen, Sioux Co., Nebraska.

11. MELANOSTOMA Schiner.

1. Melanostoma mellinum Linné.

One female from Lincoln, and two females from Glen, Sioux Co., Nebraska, which appear to be different varieties. In the specimen from Lincoln, Nebraska, the antennæ are entirely brownish black, legs reddish yellow with brown bands. In the specimens from Sioux County the general color of the antennæ is lighter and the lower part of the third joint is reddish yellow; the legs are entirely reddish yellow with no brownish rings. The wings of the western specimens are relatively longer than those of the eastern specimen.

12. EUPEODES Osten Sacken.

1. Eupeodes volucris Osten Sacken.

Specimens from Lincoln, and Glen, Sioux Co., Nebraska.

13. LASIOPHTHICUS Rondani.

1. Lasiophthicus pyrastri Linné.

Two females, one from Lincoln, and the other from Sioux Co., Nebraska.

14. SYRPHUS Fabricius.

1. Syrphus americanus Widemann.

Numerous specimens from Lincoln, West Point, and Falls City, Nebraska, which show considerable variation in size and the bands of the abdomen.

2. Syrphus arcuatus Fallen.

Two specimens from Glen, Sioux Co., Nebraska.

3. Syrphus creper Snow.

One male from Sioux Co., Nebraska. Formerly recorded from Colorado and New Mexico.

4. Syrphus mentalis Williston.

♂. Length 12 mm. Eyes densely pilose, front shining greenish black, extending on either side below the base of the antennæ, covered with long black hair. Face whitish yellow with a faint brownish tint, cheeks and broad median stripes from near base ot antennæ to oral margin black, tubercle large and prominent. Face covered with black and white pile, shorter and more sparse than that of the front. Antennæ brownish black, third joint longer than wide. Thorax shining greenish black with dark colored pile, that of the pleura longer and whitish yellow. Scutellum dark brown, subtranslucent, covered with long black pile. Abdomen broader than the thorax, deep black, opaque on the second segment, shining on the remaining segments, everywhere covered with black pile except anterior lateral boarder of the second segment and yellow bands which have yellowish white pile. Yellow on the second segment in the form of two slender spots widely separated and not touching the lateral borders of the segment, band on third segment a little wider, slightly interrupted and touching the lateral borders of the segment in nearly its whole extent, band on the fourth segment more slender, more interrupted but not so widely as those on the second segment and touching the lateral border in its whole extent, fifth and sixth segments black with only a luteous posterior border. All the bands of the abdomen slender. Legs yellowish red, base of femora (nearly all of the hind femora), and hind tarsi black. Hind tibiæ, front and middle tarsi brown. Wings lightly tinged with brown, stigma brown.

One male from Glen, Sioux Co., Nebraska, which shows considerable variation from the description of the female.

Formerly recorded from females from Washington and Alaska.

5. Syrphus ribesii Linné.

Specimens from Beatrice and Glen, Sioux Co., Nebraska.

15. ALLOGRAPTA Osten Sacken.

1. Allograpta fracta Osten Sacken.

One female from West Point, Nebraska (H. S. Smith). I have compared this specimen with the one listed by Hunter in the Canadian Entomologist, Vol. XXVIII, p. 95, and it is similar except that the lateral borders of the facial stripe are not so sharply defined, and the stripe extends farther toward the oral margin. This species was formerly known in the United States from a single male taken by Osten Sacken in California, and by a female taken in the same locality eleven years later by Professor Bruner. There is some doubt as to the validity of this species, but I will list it under this name.

2. Allograpta obliqua Say.

Specimens from Lincoln, West Point, and Glen, Sioux Co., Nebraska.

16. XANTHOGRAMMA Schiner.

1. Xanthogramma ænea, new species.

♀. Length 10 mm. Face, cheeks and front yellow with a brownish red tinge, vertex dark metallic green from which arises a stripe that extends a trifle over half way to the base of the antennæ. Antennæ brown, reddish on first, second, and lower part of third joints. Thorax shining bronze-green, with a broad indistinct stripe on the lateral borders. Scutellum translucent yellow. Thorax with short light colored pile, scutellum with longer black and yellow pile. Pleura with poorly defined yellow spot. Abdomen opaque black, first segment shining yellow on the sides, second segment with a yellow band narrowly interrupted, touching the lateral borders in its whole extent, third segment with a wide band, obtusely emarginate behind and touching the lateral borders in nearly its whole width, only very slightly attenuate, fourth segment with a similar band more deeply emarginate behind and touching the lateral borders as in the preceding segment, the black subfulgent, fifth segment with a similar band and black subfulgent. Incisions of the segments and posterior margins of third, fourth and fifth segments yellow. Legs yellow, hind femora and hind tibiæ with a brownish ring, hind tarsi brownish. Wings hyaline, stigma light yellowish.

Type. — West Point, Nebraska, June, 1906 (P. R. Jones), 1 ♀.

This species can be separated from *X. flavipes* by not having such a clearly defined thoracic stripe, and spot on the pleura, and also by not having any black on the scutellum. The yellow lateral stripes touch the lateral borders of the segments in nearly their whole extent. This character is wanting in *X. emarginata* except on the second segment. The second and third segments are not yellow at the anterior angles as in *X. emarginata*.

17. MESOGRAMMA Loew.

1. Mesogramma geminata Say.

Specimens from Lincoln, and West Point, Nebraska. Formerly recorded from Connecticut, Washington, New Jersey, Pennsylvania, Colorado, Maryland and Montreal.

2. Mesogramma marginata Say.

Specimens from Carns, West Point, Lincoln, Beatrice and Glen, Sioux Co., Nebraska.

3. Mesogramma polita Say.

One male and one female from Lincoln, Nebraska.

18. SPHÆROPHORIA St. Fargeau et Serville.

1. Sphærophoria cylindrica Say.

Specimens from Lincoln, Carns, West Point, and Glen, Sioux Co., Nebraska.

2. Sphærophoria sulphuripes Thompson.

One male from Lincoln, Nebraska, labeled "bred from pupa in plum." When compared with a specimen from California the abdominal bands are broader and not arcuate as in the California specimen, also the wings do not exceed the tip of the abdomen.

19. RHINGIA Scopoli.

1. Rhingia nasica Say.

Four females and two males from South Bend and Lincoln, Nebraska. Formerly recorded from New England, Indian Territory, Kentucky, Montreal, New York, New Jersey and Quebec.

20. VOLUCELLA Geoffroy.

1. Volucella fasciata Macquart.

Numerous specimens from Lincoln, Nebraska, Glen, Sioux Co., Springview Bridge, Brown Co., Bad Lands, Mouth of Monroe Cañon, Sioux Co., Nebraska.

2. Volucella satur Osten Sacken.

Two males and one female from Glen, Sioux Co., Nebraska.

Formerly recorded from Utah, Colorado, Western Kansas, and New Mexico.

21. CONDIDEA Coquillett.

1. Condidea lata Coquillett.

♀. Length 14 mm. Face yellow, median stripe wanting, cheeks without black stripe. Front grayish yellow, spotted with black in blotches and covered with long black hairs, vertex black. First two joints of antennæ brownish black, third subquadrate, brown with a greenish tinge, arista feathery plumose. Thorax shining blue metallic with a greenish tinge, clothed with short, fine yellowish pile, black on the posterior part and scutellum, posterior border of the scutellum with a row of strong bristles. Pleura with long, light yellowish pile. Abdomen opaque, posterior border of the third, posterior half of fourth and remaining segments subfulgent, everywhere clothed with short, thick, bristly hairs, except the anterior lateral border of the second segment and the reddish-yellow spots on the second segment. Abdomen with eight spots, second segment with two large reddish yellow spots, widely separated, not touching the lateral borders of the segments, slightly emarginate on the outer posterior margin, third segment with four smaller, nearly quadrate spots, two on each side, the lateral ones being less than one half as large as the inner ones, fourth segment with a spot on each side shaped like the print of a foot, larger than the spots on the third segment, but not so large as those on the second segment. Legs black, apex of front and middle femora, base of front and middle tibiæ yellow. Wings cinereous hyaline, brownish on the front and basal part, veins black, third vein with a considerable regular curve.

Warbonnet Cañon, Sioux Co., Nebraska, June 22, 1901 (J. C. Crawford), 1 ♀. Jim Creek, Sioux Co., Nebraska, June 22, 1901 (M. Cary), 1 ♀ on *Malvastrum*.

This remarkable looking fly was determined as a new species of *Sericomyia*, but upon comparing the specimens with Coquillett's types at the National Museum, I believe them to be the same, although some variation exists, as the descriptions will show. This is probably only a sexual variation as my specimens are females and Coquillett's is a male. The abdominal spots have a tendency to be hour-glass-shaped, especially those on the fourth segment. Those on the third segment seem to have become constricted until they have separated widely, thus making four spots on the segment. The spots on the second segment have only a slight constriction on the posterior part.

22. ERISTALIS Latreille.

1. Eristalis æneus Scopoli.

Specimens from Lincoln and West Point, Nebraska.

2. Eristalis dimidiatus Wiedemann.

Specimens from Lincoln and West Point, Nebraska.

3. Eristalis flavipes Walker.

One female from Sioux Co., Nebraska.

4. **Eristalis inornatus Loew.**

One female from Bad Lands, mouth of Monroe Cañon, Sioux Co., Nebraska, which answers to Loew's description except that the pile on the abdomen is nearly all white, the only velvety black cross band on the third segment is the posterior one and it is not emarginate. Length 9.5 mm. Formerly recorded from Red River of the North and Idaho.

5. **Eristalis latifrons Loew.**

Specimens from McCook, West Point, South Bend, Carns, Lincoln, Nebraska, Hitchcock Co., and Glen, Sioux Co., Nebraska. It is the most common species of *Eristalis* found in the state.

6. **Eristalis montanus Williston.**

Two males from Sioux Co., Nebraska.

7. **Eristalis temporalis Thomson.**

Specimens from War Bonnet Cañon, Sioux Co., Bad Lands, mouth of Monroe Cañon, Sioux Co., and Glen, Sioux Co., Nebraska.

8. **Eristalis tenax Linné.**

Numerous specimens from Lincoln, West Point, and Glen, Sioux Co., Nebraska.

9. **Eristalis transversus Wiedermann.**

Two males from South Bend and a female from Lincoln, Nebraska.

23. TROPIDIA Meigen.

1. **Tropidia mamillata Loew.**

Four specimens from Cedar Bluffs, Nebraska.

2. **Tropidia quadrata Say.**

A female from West Point, and one from Lincoln, Nebraska.

Formerly recorded from Connecticut, Canada, Washington, New Jersey and New York.

24. HELOPHILUS Meigen.

1. **Helophilus conostoma Williston.**

One female from West Point, Nebraska. As compared with specimens from Pennsylvania and Illinois it has larger and more pronounced black spots on the hind femora and more black on the legs in general. Formerly recorded from Connecticut, New Jersey, New York, Massachusetts, Illinois and Canada.

2. **Helophilus integer Loew.**

A female from West Point, and a female from Lincoln, Nebraska. Formerly recorded from New Jersey and New York.

3. **Helophilus lætus Loew.**

One male from Sand Hills, Thomas Co., Nebraska. This species also, as in *H. integer*, has the small black spots of minute spinous bristles on the inner basal part of the anterior and posterior femora. It is smaller than *H. integer* and the basal half of the front and middle femora are black. Formerly recorded from Connecticut, New York, Wisconsin, Michigan and New Jersey.

4. **Helophilus latifrons Loew.**

Numerous specimens from Gering, Cedar Bluffs, West Point, Hardy, Lincoln, Glen and Gordon, Nebraska.

5. **Helophilus similis Macquart.**

Specimens from Lincoln and Cedar Bluffs, Nebraska.

25. MALLOTA Meigen.

1. **Mallota bipartita Walker.**

Length 13 mm. Black, shining species, front black shining, along the sides yellow pollinose, and entire front and vertex, excepting the ocellar space which has black hairs, covered with long yellowish white hairs. Antennæ dark brown, arista yellow, black at tip. Face concave below the antennæ, not so prominent as in *M. fascialis* but more so than in *M. posticata*, shining black, covered with yellowish white pollen on the sides which leaves the cheeks and middle shining black, also a few yellowish white hairs on the sides. Thorax, scutellum and pleura thickly clothed with yellowish white pile. Abdomen black shining, longer than the thorax, second segment a trifle wider than the thorax, remaining segments about as wide as the thorax, second and third segments thinly clothed with short, black pile, anterior lateral margin of the second segment with a patch of long yellowish white hair, fourth and fifth segments clothed with long dense black hair, a few tinged with yellow. Legs black, densely clothed with black bristly hairs, front and middle legs fringed with long yellowish hair, tarsi grayish black, last joint yellowish. Wings nearly hyaline, veins black, lighter toward the base, a brown spot below the stigma. Halters brownish.

One female from Beatrice, Nebraska, July 8, 1904 (M. H. Swenk).

I give a description of this specimen which is undoubtedly *M. bipartita*. The only difference between it and the specimen of *M. cimbiciformis* is the lighter colored pile. I think that *bipartita* is probably a synonym of *cimbiciformis*.

2. **Mallota cimbiciformis Fallen.**

One female from Milford, Nebraska, noted by Hunter in the Canadian Entomologist, Vol. XXVIII, p. 99.

3. Mallota fascialis Hunter.

Type specimen and five metatypes from Lincoln and Sioux Co. Nebraska. In the eastern specimens the epistoma is slightly less projecting than it is in the western ones, and there is also some variation in the size of the insects. The females agree with Hunter's description of the male. This is evidently quite a variable species.

4. Mallota illinoisensis Robertson.

One female from West Point, Nebraska, June 22, 1906. The hind femora have scarcely any black on them, and the third joint of the antennæ is broader than long. Length 12 mm. Otherwise it answers to Robertson's description. Formerly recorded from Ill.

5. Mallota posticata Fabricius.

One female from Nebraska City, Nebraska, September 14, 1901 (M. A. Carriker).

Formerly recorded from Carolina, Pennsylvania, New York, New Jersey, New Hampshire, Canada and Kansas.

26. TRIODONTA Williston.

1. Triodonta curvipes Wiedemann.

One male from Lincoln, Nebraska. Formerly recorded from Nova Scotia, California, Colorado and New Jersey.

27. SYRITTA St. Fargeau et Serville.

1. Syritta pipiens Linné.

Numerous specimens from Beatrice, Carns, Lincoln and Glen, Nebraska.

28. XYLOTA Meigen.

1. Xylota analis Williston.

One male from War Bonnet Cañon, Sioux Co., Nebraska, noted by Hunter in the Canadian Entomologist, Vol. XXVIII, p. 100.

2. Xylota angustiventris Loew.

One male from Sioux Co., Nebraska mentioned by Hunter in the Canadian Entomologist, Vol. XXVIII, p. 101, and a male from West Point, Nebraska.

3. Xylota ejuncida Say.

One female from West Point, Nebraska, June 22, 1906 (P. R. Jones).

4. **Xylota flavitibia Bigot.**

Two specimens from Sioux Co., Nebraska, noted by Hunter in the Canadian Entomologist, Vol. XXVIII, p. 101.

5. **Xylota fraudulosa Loew.**

Seven specimens from Milford, Nebraska, listed by Hunter in the Canadian Entomologist, Vol. XXVIII, p. 101, and one specimen from West Point, Nebraska.

6. **Xylota obscura Loew.**

One specimen from Sioux Co., Nebraska, listed by Hunter in the Canadian Entomologist, Vol. XXVIII, p. 101, and one specimen from West Point, Nebraska.

7. **Xylota pigra Fabricius.**

Two males and two females from Sioux Co., Nebraska.

29. CRIORHINA Meigen.

1. **Criorhina umbratilis Williston.**

One female from South Bend, Nebraska, April 17, 1905, on *Prunus virgianus* (P. R. Jones). Formerly recorded from Connecticut, Ohio, Tennessee and Kansas.

30. MILESIA Latreille.

1. **Milesia virginiensis Drury.**

A magnificent specimen of a male from Meadow, Nebraska, July 14, 1906 (M. H. Swenk). Formerly recorded from Virginia, Georgia, Florida, New Jersey, Illinois and New England.

31. SPILOMYIA Meigen.

1. **Spilomyia quadrifasciata Say.**

Hunter records one specimen from Lincoln, Nebraska, I have since taken it in Eastern, Southern and Northwestern Nebraska. It is rather common in Northwestern Nebraska.

32. SPHECOMYIA Latreille.

1. **Sphecomyia vittata Wiedemann.**

A male and a female from Sioux Co., Nebraska, listed by Hunter in the Canadian Entomologist, Vol. XXVIII, p. 101, and a male from Lincoln, Nebraska.

33. CERIA Fabricius.

1. Ceria abbreviata Loew.

Two males from Lincoln, Nebraska, which agree with Loew's description except that the yellow band on the posterior part of the fourth segment is broad, and the legs are chiefly reddish. Formerly recorded from Pennsylvania, Florida, Connecticut, Virginia, Colorado, New York, New Jersey and Kansas.

2. Ceria willistoni Kahl.

Two females from Lincoln, Nebraska, which answer to Kahl's description with this exception, the color of the scutellum is more yellow than red with the base narrowly black as well as the anterior lateral angles. Formerly recorded from Kansas, Texas, Florida and Virginia.

NEW AMERICAN MOSQUITOES.

By Harrison G. Dyar and Frederick Knab,

Washington, D. C.

Culex agitator, new name.

We propose this name to replace *Mochlostyrax cubensis* Dyar & Knab, since when this species is transferred to *Culex*, as will follow from *Mochlostyrax* not being separable from *Culex* in the adult state, it is preoccupied by *Culex cubensis* Bigot.

Culex ochropus, new species.

Dark brown, the head and thorax rather sparsely clothed with light yellow scales and brownish bristles, not forming any distinct ornamentation, but contrasting with the brown membrane below; abdomen clothed with pale testaceous scales, unbanded. Legs pale testaceous, the ends of the joints, as well as the ends of the proboscis and palpi brownish. Wing scales pale brown, dense. Claws simple.

One ♀, Centre Harbour, New Hampshire, July 19 (H. G. Dyar).

Type.— Cat. No. 10261, U. S. Nat. Mus.

Culex tæniopus, new species.

Proboscis and palpi black; thorax dark brown with black and ochraceous scales, not forming a defined pattern; abdomen with dark scales bluish luster and brown hairs, unbanded above; legs black, with broad white rings on the tarsi, involving both ends of the joints, the last tarsal joint wholly white. Wings with brownish scales on the veins, not very dense.

One ♀, Bluefields, Nicaragua (W. F. Thornton).

Type.—Cat. No. 10260, U. S. Nat. Mus.

Tæniorhynchus coticula, new species.

Proboscis brown, blackish outwardly, a white ring in the middle, the tip also white; palpi black, whitish at the end; thorax light brown, the impressed lines pale, the ridges dark, forming a series of narrow dark lines; abdomen black above with a slight bluish luster, unbanded, below with a sublateral row of small segmentary silvery spots; legs black, the hind femur with a spot at outer third and tip of bluish silvery white, the hind tarsal joints broadly white ringed at the base, the last joint all white.

Two ♀♀, Bocas del Toro, Panama, Sept. 25, 1903 (P. Osterhaut).

Type.—Cat. No. 10281, U. S. Nat. Mus.

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Class I, HEXAPODA.

Order V, LEPIDOPTERA.

PHILOSAMIA CYNTHIA AND CALLOSAMIA PROMETHIA CROSSES.

By Louis H. Joutel,

New York, N. Y.

It may be of interest to supplement Miss Soule's notes on *cynthia* and *promethia*[*] crosses with my experiences last summer when I was so fortunate as to get some hybrid larvæ that differed from both parents.

Having had crosses a number of times for several years between *cynthia* ♀ and *promethia* ♂ without being able, for some unknown cause to raise the resulting larvæ to maturity, I determined, as Mr. F. E. Watson was kind enough to again supply me with cocoons of both species, to try this past summer what could be accomplished with care in crossing the two species. With a stock of two thousand cocoons and the aid of my sister I thought some results could be had.

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[*] Entomological News, December, 1906, p. 396.

From the start we found that there was a great difference in the desire to mate in the two species and also in individuals of the same species. The *promethia* ♂ was generally quite willing and even anxious to take a *cynthia* ♀ for wife but she was so averse to a mixed marriage, that the attempt, although persisted in by the *promethia* ♂, was usually a failure and the eggs infertile. It was interesting to watch the *cynthia* ♀ attempt to get rid of the *promethia*, by contracting the abdomen, more especially the tip which was entirely retracted and the body was meanwhile turned from side to side until the claspers of the *promethia* slipped off. The *promethia* would try it again and again with the same result, and it was only in a few cases that the attempt was successful and the eggs fertile. In a number of cases the mating was evidently successful but the *cynthia* would refuse to lay eggs and hang to the bag with her abdomen retracted to its smallest compass until death, unless a *cynthia* ♂ was introduced when mating readily took place and egg laying would begin.

In my experience I have never found *cynthia* ♀ willing to mate with two males so that remating with *cynthia* after *promethia* is interesting.

In these two crosses the eggs were typical *cynthia* and the larvæ, as Miss Soule states, were also *cynthia* except that mine seemed to have a tendency to yellowish cream color; but this may have been due to rearing in jars.

The silk made by these larvæ was typical *cynthia* silk. The cocoons of the singly mated ones were rather smaller than normal *cynthia* but the cocoons of the twice mated females were about normal in size to *cynthia*. Both, to me, presented the appearance and shape of true *cynthia* cocoons in all particulars, and the larvæ had the same habit of spinning a long stem, often a foot long, where occasion required it. The opening of the cocoon was also arranged and had the appearance, as in *cynthia*. Should my lot of cocoons of these two crosses be mixed with true *cynthia* ones I doubt if any one could separate them. This difference from the observations of Miss Soule may be accounted for by their feeding on *Ailanthus*.

The real interest in the series of crosses came from some matings of *promethia* ♀ with *cynthia* ♂. In these crosses we had the same difficulty of the female not laying until remated with a male of her species to a greater degree, and there was not that desire to mate in the male as there was in the opposite cross, while the female had the same repugnance to the *cynthia* ♂ as there was in the reverse case, so that these matings were few.

The eggs resulting from these crosses were not to be distinguished from normal *promethia* eggs. The eggs of the single matings gave larvæ, a few of which were not to be distinguished from normal *promethia*, but most of them had heavy black bands on the segments, a few being nearly all black. At the first moult we were agreeably surprised to see the fine cream-colored *cynthia*-like larvæ that crawled out of the first stage *promethia* skins. So astonished were we that had we not seen them we would have supposed that *cynthia* larvæ had got in the jar by accident. In the next stages the dual parentage of the larvæ was very evident. Colored figures of these stages I hope to publish later with the figures of the resulting moths.

The cocoons of these were very small and were either spun between two leaves or in the folded corner of one; the tendency to stem-making was partly lost, some few not making any at all, others spinning a layer of silk to the leaf stem. In this lot several crawled out of the cocoons when nearly completed, but we did not have this happen in the crosses that had *cynthia* females.

The sum of the results of crossing these species both ways shows that it is the *cynthia* which has the greater effect on the resulting hybrid larvæ and it remains to be seen what the results will be in the imago.

The cocoons show less specialization than any of the parents, but have the *cynthia* characters predominating.

Miss Soule gives a wrong interpretation of the pulling in of the loose threads at the opening of the cocoon. What I have observed is that the larva takes a bunch of threads in its mandibles and pulls these threads in by suddenly retracting the head and front segments, *meanwhile holding on by its "props"* to the bottom or side of the cocoon.

Since writing the above Miss Soule has informed me that she had also given some notes on these hybrids in *Psyche* for November, 1902. My results, however, were different from hers in that all my larvæ of *cynthia* ♂ and *promethia* ♀ were of the same type, and only differed slightly in color, though a larger amount of material might have shown different results. The bifid horn on the eleventh segment she mentions is also occasionally bifid in pure *promethia*.

BOTIS TORALIS GROTE.

By Harrison G. Dyar,

Washington, D. C.

This species was described by Grote in 1881, from material collected by Prof. F. H. Snow in New Mexico. The type was returned to Professor Snow, and the species has remained unknown to entomologists generally ever since. In Grote's check list of 1882 it is listed under *Botis* Schrank (p. 52, no. 48); in Smith's list of 1891, it is placed in *Pyrausta* (p. 76, no 4035); Hampson lists it as unknown, under the caption " Auctorum " as *Botys toralis*, and refers to Bull. U. S. Geol. Surv., vi, pp. 167, 178, giving the locality "U. S. A." (Proc. zool. soc. Lond., 1899, 273); in Bull. 52, U. S. Nat. Mus., it is listed as *Pyrausta toralis*, and there were then no specimens in the National Museum (p. 392, no. 4449).

I have recently received the type specimèn from Professor Snow, who kindly sent it for examination at my request. It bears three labels: (1) Socorro, N. M., 4,000 ft., Aug. '81, F. H. Snow; (2) Type specimen, species discovered by F. H. Snow; (3) 872. The head and abdomen have been eaten partially by museum pests, so that the antennæ are missing as well as the palpi; portions of two legs remain, including one fore leg. The whole specimen is darkened by grease. I have also received from Professor Snow, two other fresh specimens of the species, taken at San Bernardino Ranch, Cochise Co., Arizona, 3,750 ft., in August. The pink color is more restricted in these than in the type, not consisting of an even border along the outer margin, but of a straight band that leaves a narrow yellow space between itself and the pink tipped fringe. I do not think this is a specific difference, the pink, in the New Mexican form being only diffused over this yellow space. The ground color of the fore wings is clear yellow, not olive yellow as described by Grote, and the hind wings are nearly white, not "pale fuscous." The differences in color seem to be wholly due to the effect of the grease on the type, and this greasy condition must have obtained originally when the specimen was first described.

The species does not belong to the genus *Pyrausta*, and is not even a Pyralid. It is referable to the Noctuidæ, and falls in Sir George Hampson's subfamily Acronyctinæ (Cat. Lep. Phal., iv, 3, 1903). The front of the head is protuberant and bears a vertical and a transverse ridge which form a cross, bare of scales in all the specimens; the vestiture is of mixed hairs and scales; the fore tibiæ are very short, hardly longer than wide, expanded at the tip and armed with a long inner and a shorter outer claw. I am unable to suggest the proper genus. This may be left for the next volume of the Cat. Lep. Phalænæ.

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NEW AMERICAN MOTHS.

By HARRISON G. DYAR,
WASHINGTON, D. C.

Family ARCTIIDÆ.

Phragmatobia nundar, new species.

Head and thorax clothed with woolly hair, black; abdomen blackish with a partly obsolete crimson lateral band. Fore wing black, a broad conspicuous stripe along the submedian fold from base, not quite touching outer margin; a slender white line from outer third of costa, running obliquely outward, curved abruptly inward at its termination above the submedian stripe; fringe intermixed with whitish. Hind wings crimson with a narrow outer black border, twice indented by the crimson area. Below the wings are paler, the markings repeated, the dark margin of the hind wings broadened and diffused, with a faint discal spot and some cloudings beyond. Expanse, 30 mm.

One male, without antennæ, Mexico City, Mexico (R. Müller, no. 790).

Type.—Cat. No. 10330, U. S. Nat. Mus.

Family GEOMETRIDÆ.

Glaucina puellaria, new species.

Dark gray, the lines black, crenulate; discal mark present; both lines have narrow whitish edging and the subterminal line is shaded white. Hind wings gray, whitish on disk, the inner margin marked like the fore wings with the inception of the two lines. Expanse, 25 to 32 mm.

Five females in the U. S. National Museum, one female i[illegible] collection of Prof. F. H. Snow. Catalina Springs, Ariz[illegible] A.

Schwarz); So. Arizona (O. C. Poling); Baboquivari Mts., Arizona (F. H. Snow).

The species is much like *G. pygmeolaria* Grote, but much larger, the markings more distinct. I have also two males which are probably attributable to this species, but have not been marked as types. They are similar to the females, but the markings are less defined and more broken, and the color of the wings is a smoother, more silvery gray.

Type. — Cat. No. 10278, U. S. Nat. Mus.

Glaucina erroraria, new species.

Pale gray, diluted to whitish over the disk of fore wings, the lines black, crenulate, tending to be broken into dots; discal mark fused to the outer line; subterminal line whitish, subcrenulate. Hind wings pallid on the disk, gray on the outer margin, the inner margin light gray like the fore wings with the inceptions of the lines marked. Expanse, 25 to 30 mm.

Four females in the U. S. National Museum. "Ariz. Collection J. B. Smith. Type No. 3917 U. S. N. M.;" also a label in Dr. Hulst's writing "*Cænocharis elongata* Hulst, type;" Tucson, Arizona, July 19–20 (E. A. Schwarz); Hot Springs, Arizona, June 21 (Schwarz & Barber).

The first specimen is one of Dr. Hulst's types of *Cænocharis elongata*, which he gave to the National Museum. It is, however, wrongly referred generically, and is not the true type, although it is doubtless one of the specimens that was before Dr. Hulst, and which caused him to give the locality "Arizona" in his description. I have the true *elongata* from Texas in four examples, three of them from the Belfrage collection. Dr. Hulst gave me another "type" of *elongata* which is *Glaucina pygmeolaria* Grote. The true type of this composite species is probably in the Hulst collection at New Brunswick, N. J.

Type. — Cat. No. 10279, U. S. Nat. Mus.

Glaucina mormonaria, new species.

Pale gray, pulverulent with dark scales, the disk more or less washed with paler, whitish, slightly ochraceous tinted; lines dark, normal, but broken pulverulent, dotted on the veins, nearly lost; discal dot indistinguishable. Subterminal line white, shaded, crenulate, preceded by a darker shade, which is most pronounced in the females and renders the line rather distinct. Hind wings pale gray, uniform over the disk, the internal margin more pulverulent but not darker, marked with the inception of the two dark lines. Expanse, ♂, 28 to 32 mm.; ♀, 24 to 26 mm.

Six specimens, four males and two females, Stockton, Utah (O. C. Poling).

Type. — Cat. No. 10280, U. S. Nat. Mus.

Cœnocharis denticularia, new species.

Dark cinereous, not entirely uniform, light shades showing in places; lines lost, the outer showing as a row of little teeth along the veins; discal mark black, upright, rather thick; subterminal line white, sharply zigzag, contrasted. Fringe concolorous, a series of black points at the ends of the veins. Hind wings more brownish cinereous, with very little marking at the anal angle. Expanse, 29 mm.

One male, Chiricahua Mts., Arizona (H. G. Hubbard).

Type — Cat. No. 10334, U. S. Nat. Mus.

The species resembles *Glaucina golgolata* Strecker (described as *Eupithecia golgolata;* see Bull. 52, U. S. N. M., No. 3311, where the name is erroneously written *golgata*), but that has a claw on the fore tibia. The specimen was determined by the late Dr. Hulst as *Cœnocharis interruptaria* Grt., but I do not think it is that species, the presence of the discal dot and the shape of the subterminal line well distinguishing it.

Family NOCTUIDÆ.

Pleonectyptera noctuidalis, new species.

Brownish gray to dark gray; lines black, narrow, denticulate, the inner slightly irregular, the outer bowed outward around the reniform; both reddish edged, slender, sometimes nearly obsolete, but ending on the costa in broad black marks which persist. Reniform, a double black ringlet, partly filled in with black; subterminal line irregular, very faint. Hind wings nearly as dark as the fore wings, with narrow dark mesial line and clouded discal spot. Expanse, 18 to 22 mm.

Ten specimens, Oracle, Arizona (E. J. Oslar); Tucson, Arizona (E. J. Oslar); Baboquivari Mts., Arizona (F. H. Snow).

Type. — Cat. No. 10295, U. S. Nat. Mus.

Rhizagrotis reclivis, new species.

Head brownish gray, a black line across the front and one before tips of tegulæ; thorax dark yellowish brown with blackish shades along the patagia and centrally on the disk. Fore wings ochraceous brown in basal space and along costa and upper part of cell to reniform, the rest of the wing suffused with dark purplish brown except an irregular space subterminally where the light ochraceous color prevails; lines indistinct, geminate, crenulate, blackish; claviform black outlined, very small; orbicular a long pointed ellipse, nearly touching the reniform, which is upright, both these spots filled with the ochraceous brown color and defined below by the dark shade, which becomes more blackish through the cell to the outer line; subterminal line lost; a row of black terminal dots, small, with preceding black streaks above. Hind wings soiled whitish, darkest before the fringe. Expanse, 32 mm.

Three specimens, Plummer's Island, Maryland (H. S. Barber); Tryon, North Carolina (W. F. Fiske); St. Louis, Missouri (H. McElhose).

Type.—Cat. No. 10296, U. S. Nat. Mus.

Nearly allied to *R. acclivis* Morrison, but much less distinctly marked, the streaked appearance being absent and the dark shading more uniform and more extended. The North Carolina specimen was submitted to Prof. J. B. Smith, who remarked: "*Rhizagrotis acclivis!* The first authentic specimen I have seen from this region. It indicates that the New York locality which I questioned in my catalogue may have been correct or it may indicate two very similar species which I have not had material enough to discriminate."

Cirrhophanus nigrifer, new species.

Fore wings pale creamy, bronzy yellow between the lines; some bronzy yellow at base, especially along median vein; inner line sharply angled on submedian and discal veins, the lower angle reaching the middle of the wing, the upper the middle of the cell, dark brown, narrow; veins in the median space irregularly marked in brown; outer line strongly bent outward opposite the cell, rather sharply angled above, indented at vein 2; a brownish subterminal line, clouded within, irregularly parallel to the outer margin; fringe concolorous with the wing. Hind wing black, the fringe golden yellow as also small indentations on the veins and a larger one above anal angle. Beneath the disk of fore wings is broadly black, the margins and whole of hind wings golden yellow. Expanse, 30 to 38 mm.

Three males and two females from the Schaus collection, Guadalajara, Mexico.

Type. —Cat. No. 10331, U. S. Nat. Mus.

The species has been well figured in the Biologia Centrali-Americana (Lep. Het., pl. 94, fig. 16) as *Cirrhophanus triangulifer* Grote, from which the black hind wings abundantly separate it.

Cirrhophanus magnifer, new species.

With the markings of the preceding species; the wings are longer, the costa straighter; the pale ground color is less overspread with bronzy; the lines are slender, scarcely heavier than the linings on the veins; the outer line is duplicated with another line within it, more remote and distinct than usual, somewhat crenulate on the veins; the submarginal cloud is obsolete and the line appears pale, slender, well defined although faintly; the fringe is conspicuously darker than the wing, pale brown, twice interlineate with dark brown. Hind wings of the male blackish on the disk as far as the outer third, the margin pale creamy; of the female, blackish almost to the margin. Expanse, 45 to 49 mm.

One male and one female from the Schaus collection, Guadalajara, Mexico.

Type. —Cat. No. 10332, U. S. Nat. Mus.

The largest species of the genus; the body parts also are especially robust.

Cirrhophanus dubifer, new species.

Close to *C. dyari* Cockerell, but differing as follows: Larger, the thorax especially heavier and more robust; the outer line retreats more rapidly from the costa. leaving a broad clear space, and retreats less at vein 2, the indentation being smaller, Hind wings blacker at the base than in ♀ *C. dyari*, the margin paler, more nearly whitish and somewhat broader. Expanse, 38 mm.

One female, No. 801, from Mr. R. Müller (of Mexico City) without exact locality.

Type. — Cat. No. 10333, U. S. Nat. Mus.

Perigea hypocritica, new species.

Thorax and fore wings bronzy brown, the thoracic crests tipped with white and a double row of white points on the basal abdominal segments. A group of six white points at the base; seven points on the costa; three rather large points centrally in the place of the inner line; orbicular, a yellowish dot with three white points beyond it; reniform white, yellow tinted, expanded a little below, surrounded by large and small white points, those beneath the reniform fused into a curved bar; outer line faintly indicated, yellowish, crenulate; four rounded white spots above and one near anal angle represent the subterminal line; a terminal row of small white dots and white specks at the apex of the brown fringe. Hind wings fuscous, whitish basally, or nearly all whitish, the fringe whitish (not yellowish). Expanse, 27 to 30 mm.

Twelve specimens, one from Bolivia (the type), two from Coatepec, Mexico (Schaus collection), nine, Orizaba and Cordoba, Mexico (R. Müller, No. 441).

Type. — Cat. No. 10335, U. S. Nat. Mus.

Rather nearly allied to *P. stelligera* Guenée, but smaller, approaching *P. circuita* Guen. The white spots are larger and fewer than in *stelligera*, more numerous than in *circuita*.

Perigea pagetolophus, new species.

Fore wings bronzy brown with many small white spots, arranged as in *P. stelligera* Guen., but even more numerously clustered about the reniform and at base; the orbicular and reniform are nearly white, only a little tinted with yellow. Hind wings whitish-shaded over the disk between the veins. Thorax with a high, loose, anterior crest, all the vestiture between the collar and patagia erected and tipped with white, giving a gray, frosted appearance. Abdominal dorsal hairs tipped with white, except on the last segment. Expanse, 28 to 30 mm.

Three specimens, Jalapa, Mexico (Schaus collection), labelled *Perigea stelligera* Gn.

Type. — Cat. No. 10336, U. S. Nat. Mus.

The species is smaller than *stelligera*, less bronzy, but most distinct by the high dorsal frosted gray crest of the thorax and abdomen.

Menopsimus, new genus.

A deltoid genus resembling *Tetanolita*. Palpi strongly upcurved and appressed to the front, well exceeding the vertex, terete, the second joint slightly thickened by scales, the third pointed. Fore legs of male not modified, the tibiæ two thirds as long as the femora. Antennæ simple. Spurs of the hind tibiæ very long. Fore wings narrow, the margins nearly parallel, outer margin rather squarely cut; hind wings trigonate.

Menopsimus caducus, new species.

Fore wings brownish to blackish gray, darkened mesially before a slightly oblique median straight whitish line that runs from the inner margin to the dark obscure discal dot, not reaching the costa. The other lines are lost, appearing only as minute blackish dots in the positions of the outer and inner lines; subterminal line faint, pale, parallel to the median line; a terminal row of black dots; the whole wing is slightly silky shining. Hind wings pale silky grayish. Expanse, 12 to 14 mm.

Nine specimens, Hampton, New Hampshire (S. A. Shaw); Washington, D. C. (H. G. Dyar).

Type. — Cat. no. 10283, U. S. National Museum. A cotype in Mr. Shaw's collection.

The specimens vary considerably in color. In the lighter, more straw-colored ones the white median line becomes faint and narrow, but is well defined by its dark edge, which then becomes a small black line.

Family PYRALIDÆ.

Canarsia feliculella, new species.

Pale gray, the fore wings narrow; inner line remote from the base with a single inward tooth in the middle, white within, dark gray without; discal mark narrow, upright, black; outer line near the margin, indented below the costa, thence straight, dark gray within, white without; hind wings whitish, tinged with gray. Expanse, 15 mm.

Two males, Brownsville, Texas, June 17, 1904 (H. S. Barber), Burnet Co., Texas (F. G. Schaupp).

Type. — Cat. No. 10343, U. S. Nat. Mus.

Similar to *C. ulmiarrosorella* Clem., but much paler, the wings narrower, the lines less dentate.

Pyla criddlella, new species.

Blackish gray, lustrous, not metallic. Lines pale, faint, slightly irregular, edged within with blackish; discal mark slender, faint, oblique, blackish. Hind wings dark gray with no yellow tint. Expanse, 18 mm.

One ♂, Aweme, Manitoba, June 10, 1904 (N. Criddle).

Type. — Cat. No. 10344, U. S. Nat. Mus.

Similar to *P. hanhamella* Dyar from the same region, but smaller, the lines of the wings fainter and straighter, the hind wings without yellowish shading.

JOURNAL

OF THE

New York Entomological Society.

EDITED BY HARRISON G. DYAR.

Publishes articles relating to any class of the subkingdom Arthropoda, subject the acceptance of the Publication Committee. Original communications in this eld are solicited.

EDITORIAL.

The article by Mr. Busck published in the March number (Journ. Y. Ent. Soc., xv, 19–36, 1907) was first issued as author's sepaates on Feb. 7, and his new species should be credited with that date.

The Entomological Society of America met in New York during he session of the American Association for the Advancement of Scince and successfully organized. We have expressed our belief that is society is unnecessary, yet as it has supplanted the Entomological lub by a stronger association, we feel now more reconciled to its xistence. We shall await with interest to see if it shall serve any rther useful purpose. Any such is at present rather obscure to us.

The question of the rule for selecting types of genera is further eated by Mr. Witmer Stone (Science, n. s., xxiv, 560, 1906) and r. D. W. Coquillett (Science, n. s., xxv, 308, 1907). Mr. Stone gues ably for the first species method, while Mr. Coquillett prounces against it. Mr. Coquillett's article is written with a naive air final judgment, yet it exhibits a singular confusion of thought. he "elimination method" is approved, yet it is perfectly evident om his remarks that it is not the elimination method that Mr. Coillett has in mind at all, but a strongly opposed method, namely that of the nomination of types. This method is as different fro the elimination method in its results as the first species method. I Mr. Coquillett is further confused by the idea that there is a right an a wrong way of selecting types. In fact, these terms are not applicable, every method of type selection being essentially arbitrary and a question of rule; the matter is only one of expediency. The elimination method has proved its utter inexpediency; the nomination of types is far better, largely eliminating the personal equation, but still objectional from the amount of otherwise profitless search involved; the first species method is by far the simplest and most expedient. Our present rules are so extremely elastic that they allow almost any method of procedure *except* the first species method. It is high time that they were amended and made definite on the only definite expedient method, that of the first species.

Since writing the above, we have read the article by President David Starr Jordan (Science, n. s., xxv, 467, 1907) favoring the first species rule. We are in complete accord with his conclusions, and cannot imagine why they should not similarly appeal to everybody.

We have been recently rather shocked by the attitude of so eminent an authority as Professor S. W. Williston on this subject. Having supposed that the only important matter requiring adjustment was the establishment of the first species method, it is a distinct surprise to find the generic type itself in doubt. Professor Williston writes: "I am unalterably opposed to any law of 'types,' and shall never recognize such myself. I consider a genus as something more than a specimen, and am decidedly opposed to any law which permits the ignorant amateur to shield himself back of a type, throwing upon some one else the burden of distinguishing generic characters. Any species that an author uses in defining a genus is equally a type if he chooses to so consider it, and it devolves upon the one who 'splits' the genus to show the differences and leave the residue to bear the original name. This is the view I have always had; it has been the practice of all dipterologists, until recently at least, and it doubtless will be their practice in the future. I do not think that rules promulgated by . . . any one . . . will abolish the custom, at least not unless some such commission as Davenport has recently suggested (a consummation devoutly to be wished) is established."

BOOK NOTICES.

Catalogue of the Lepidoptera Phalænæ in the British Museum. Volume VI. London: 1906. Catalogue of the Noctuidæ in the collection of the British Museum by Sir GEORGE F. HAMPSON, Bart.

Volume VI, now before us, comprises the Cucullianæ, a subfamily of the Noctuidæ "characterized by its trifid neuration of the hind wings combined with spineless tibiæ and smooth eyes surrounded by eye-lashes of bristle-like hair." 692 species are catalogued in 111 genera, of which 251 species in 46 genera are from the North American fauna, north of Mexico. The changes in our familiar names, while considerable, are not greater than would be expected as a result of the revision of the species of the world, nor greater than in preceding volumes of this work. The same scheme has been rigidly adhered to. The largest North American genera are *Oncocnemis*, *Graptolitha* (*Xylina* of our lists), and *Cucullia*, containing 52, 39 and 24 species respectively. *Xylina* replaces *Calocampa*, as used by us, owing to a change in the type species. Ten new genera are proposed, viz.: *Protophana* for *Herrichia cervina* Hy. Edw.; *Homoncocnemis* for *Oncocnemis fortis* Grt.; *Brachylomia* for *Cleoceris populi* Streck., *Dryobota rectifascia* Sm. and *Cleoceris discolor* Sm.; *Dryotype* for *Dryobota opina* Grt.; *Xylotype* for *Xylina capax* Grt.; *Eurotype* for *Polia acutissima* Grt., *medialis* Grt., *confragosa* Morr. and *contadina* Sm.; *Harpaglæa* for *Glæa sericea* Morr., *tremula* Harv. and *pastillicans* Morr.; *Psectraglæa* for *Glæa carnosa* Grt. and *olivata* Harv.; *Brachycosmia* for *Anchocelis digitalis* Grt. Among other changes, *Dryobota* Led. is restricted to the European *furva* Esp., and does not occur in our fauna; Staudinger's genus *Bryomnia* is used for our five species taken from *Perigea*, *Polia* and *Hadena* of our lists; *Glæa* is sunk under *Conistra* Hübn., the Tentamen names not being recognized; *Amathes* Hübn. takes most of our Orthosias. Several new species are described. The volume of plates accompanying the text seems even better than usual. We only regret that these very useful volumes follow each other so slowly, although we fully realize that it is impossible for one man to do more than Sir George Hampson does, and do it so well.

A Natural History of the British Lepidoptera. A text-book for students and collectors. By J. W. TUTT, F.E.S. Vol. VIII. London: Berlin: 1906.

This volume appears out of its regular order, preceding volumes V and VI, as the matter composing it was found ready. It has been appearing in parts under the title "A Natural History of the British Butterflies." The work extends to 479 pages, and is extremely full and extended, treating of only ten species of British butterflies, although including a considerable amount of general discussion. The method of nomination of types is followed in determining the types of genera, a fresh study having been made by the author, with results differing from previous determinations, as would be expected. A great many divisions are proposed for the butterflies. For example, the Skippers are given superfamily rank, under the name Urbicolides; the three subfamilies of Watson are said to be "evidently of full family value," and are accordingly divided into subfamilies and tribes. We think this is an exaggeration of the importance of the characters of these butterflies, caused by concentrated study of too slender material. The characters given to define the so-called families are clearly of subordinate value and are really scarcely sufficient to indicate subfamilies. We are sorry that the author did not attempt a new classification without the use of secondary sexual characters. Some of the genera are too close and should be united. This multiplicity of genera is comparatively harmless in a work treating of so few species, but if it were to be applied to the world species, it would be found impracticable. But in general we have little fault to find with the book, and much to commend. It will be many years before such a work on American Lepidoptera will be possible.

Field Tables to Lepidoptera. By WILLIAM T. M. FORBES. Worcester, Mass., 1906.

This pamphlet contains: (1) A key to the caterpillars of the Eastern United States, the only general work on American caterpillars published. It separates them by artificial characters and prominent structural differences; (2) field tables of butterflies, sphinxes, saturnians, etc., giving common as well as scientific names, brief description, size, frequency in New England, seasons, haunts, and other items of interest; (3) an artificial key to the butterflies of New England, more complete than others. Much of it has been tested by the uthor. A glossary of terms used. In all 141 pages. We think his work should prove useful to collectors and field workers. It can e had from Davis & Bannister, Worcester, Mass. The price is eventy-five cents.

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PROCEEDINGS OF THE NEW YORK ENTOMOLOGICAL SOCIETY.

MEETING OF OCTOBER 2, 1906.

Held at the American Museum of Natural History. President C. H. Roberts n the chair with ten members in attendance.

As the meeting was an informal one no scientific papers were read or any business ransacted but a number of the members gave an account of their summer's collecting xperiences.

MEETING OF OCTOBER 16, 1906.

Held at the American Museum of Natural History. President C. H. Roberts n the chair and twelve members present.

The librarian, Mr. Schaeffer, read the following list of exchanges received during he summer :

Canadian Entomol., XXXVIII, Nos. 6–10.
Prof. Dr. G. Kraatz by Dr. Walther Horn, Berlin.
Proceedings U. S. Nat. Mus., XXX, Nos. 1459, 1461, 1463 and 1465.
Wiener Entomol. Zeit., XXV, Nos. 5–9.
Zeitschrift f. Wissenschaftiche Insekten biologie, II, Nos. 3–9.
Proc. Amer. Acad. Arts and Sciences, XLII, Nos. 2–11.
Bulletino della Soc. Entomol. Italiana, XXXVII, Nos. 2, 3 and 4.
Verh. d. k.-k. Zool.-Bot. Gesellschaft, LVI, Nos. 4 and 5.
Proc. Amer. Philos. Soc., XLV, Nos. 1 and 2.
Stettiner Entom. Zeitung, LXVII, No. 1.
The Insect World, X, Nos. 6–9.
Mittheilungen der Schweiz. Entomol. Gesellschaft, XI, No 4.
Mittheilungen aus d. Naturhist. Museum in Hamburg, XIX–XXII.
Entomologische Berichten, II, Nos. 25–30.
Tijdschrift voor Entomologie, XLIX, Nos. 2 and 3.
Entomologiske Meddelelser, 1906, No. 1.
Mittheilungen aus dem Zool. Museum Berlin, III, No. 2.
Bericht über das Zool. Museum. Berlin for 1905.

The resignations of Mr. Julius Meitzen and Mr. Erich Daecke were accepted th regrets.

Mr. Groth moved that Article V of the by-laws be amended to include among the ties of the president that of delegate to the council of the Academy of Sciences. conded.

Action upon this amendment was postponed until the next meeting.

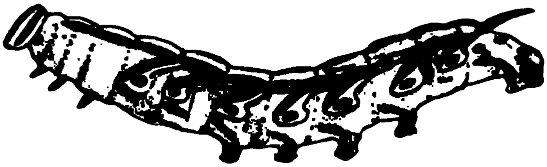
Mr. Schaeffer who represented the Society at the meeting of the committee held Ithaca, N. Y., on June 28, 1906, to organize a National Entomological Society, reported that owing to the absence of a great many of the delegates no final action was taken. All of the members present expressed themselves as in favor of such an organization. It was expected that the final adoption of the plan and organization of such a society would be accomplished during the winter session of the American Association for the Advancement of Science which was to be held in New York City during the holidays.

Mr. Schaeffer said that as he had made no collecting trip for the Museum this summer he had found considerable time to study some of the remaining unidentified material from his former expeditions in Texas and Arizona. All or nearly all of the remaining material in the families Chrysomelidæ and Anthribidæ had been studied and the results published in the Transactions of the American Entomological Society and in the Brooklyn Museum Bulletin. He remarked on some changes made in the latest catalogue of the Anthribidæ, with some of which he did not agree. He had found the Brownsville, Texas, region especially rich in this family, as twenty-one species are known to occur there. The Anthribid fauna of the Huachuca Mountains, Arizona, was not so rich, but some interesting forms occurred there, as all proved to be new. In exhibiting a collection of nearly all of the known North American Anthribidæ he pointed out the distinguishing or remarkable characters of some of the new genera and species and also mentioned that his genus *Phanosolena* of which he showed a second species from Arizona is synonymous with *Discotenes*.

Mr. Davis exhibited specimens of *Mantispa brunnea* and read some notes concerning the occurrence of this species at Lakehurst, N. J. He remarked that he had been able to trace the presence of this insect, when not too far away, by their peculiar odor, similar to that of certain flies.

Mr. Barber read a paper on the subfamily Alydinæ of the family Coreidæ. He drew a diagram of *Alydus eurinus* and explained the significance of the distinguishing characters used in separating the different genera, such as the relative length of the first segment of antennæ to length of head, relative length of hind femora, character of humeral angle, length of corium relative to membrane and whether the apical margin of corium was straight or sinuate. Among other things he stated that this subfamily was world-wide in its distribution, but of the twenty-one genera represented but six occur in the western hemisphere, all of which have representatives occurring in North America. At present there are recorded from North America, including the West Indies, fourteen species, of which nine had been listed for the United States, and he had recently added another species from the Huachuca Mountains of Arizona. He also gave the structural characters of each of the genera and a list of the species occurring within the United States as well as their habitat. Specimens of all of the known species but one were shown.

H. G. BARBER,
Secretary.



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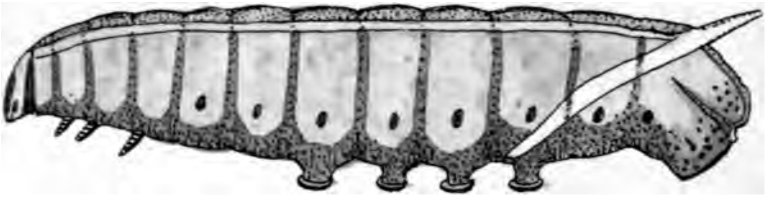

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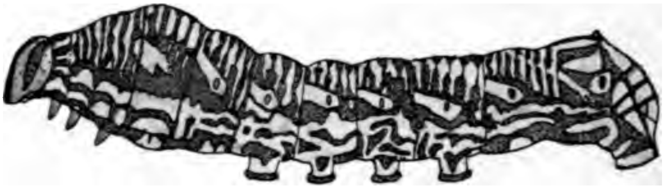

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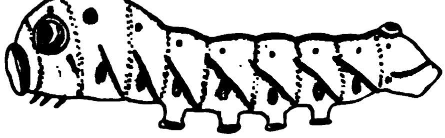

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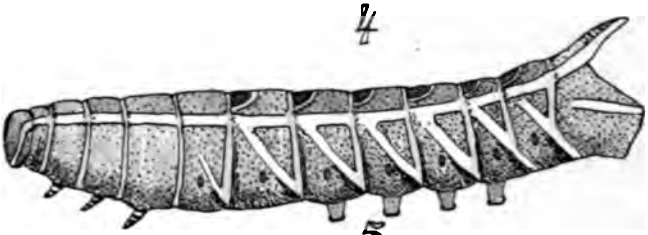

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Dominican Sphingidæ.

THE

NEW YORK ENTOMOLOGICAL SOCIETY.

Organized June 29, 1892.—Incorporated June 7, 1893.

The meetings of the Society are held on the first and third Tuesday of each month (except June, July, August and September) at 8 P. M., in the AMERICAN MUSEUM OF NATURAL HISTORY, 77th Street and Eighth Ave.

Annual dues for Active Members, $3.00.

Members of the Society will please remit their annual dues, payable in January, to the treasurer.

Officers for the Year 1907.

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C. H. ROBE[illegible]S.

Price List of Entomological Publications

For Sale by the New York Entomological Society.

LINELL, MARTIN L.	A short review of the Chrysomelas of North America.	5 pp.	15c.
CASEY, THOS. L.	Studies in Ptinidæ, Cioidæ, and Sphindidæ of America.	32 pp.	75c.
	A revision of the North American Coccinellidæ.	98 pp.	$1.50
	Review of the American Corylophidæ, Cryptophagidæ, Tritomidæ and Dermestidæ, with other studies.	(Cuts) 121 pp.	$2.00
FALL, H. C.	Synopsis of the species of Acmæodera of America north of Mexico.	36 pp.	75c.
	On the affinities of the genus Tachycellus with descriptions of new species.	10 pp.	20c.
LENG, CHARLES W.	Notes on Coccinellidæ, I, II.	31 pp., 3 pl.	$1.00
SCHAEFFER, C.	Synopsis of the Species of Trechus, with description of a new species.	4 pp., 1 pl.	20c.
WICKHAM, H. F.	The North American species of Cotalpa.	4 pp.	10c.
FOX, WILLIAM J.	Synopsis of the species of Nysson, inhabiting America north of Mexico.	7 pp.	20c.
COQUILLETT, D. W.	Synopsis of the dipterous genus Symphoromyia.	4 pp.	10c.
	Revision of the dipterous family Therevidæ.	6 pp.	15c.
NEUMOEGEN and DYAR.	A preliminary revision of the Bombyces of America north of Mexico.		$1.50
DYAR, HARRISON G.	A review of the North American species of Pronuba and Prodoxus.	3 pp.	10c.
	A revision of the Hesperiidæ of the United States.	32 pp.	60c.
	Synoptic table of North American mosquito larvæ.	5 pp.	10c.
	The North American Nymphulinæ and Scopariinæ.	31 pp.	55c.
DYAR, H. G., and KNAB, FREDERICK.	The larvæ of Culicidæ classified as independent Organisms.	61 pp., 13 pl.	$1.50.
KEARFOTT, W. D.	Revision of the North American species of the genus Choreutis.	20 pp.	50c.
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BUENO, J. R. DE LA T.	The Genus Notonecta in America North of Mexico.	24 pp., 1 pl.	60c.

The above papers will be sent on receipt of price by

CHARLES SCHAEFFER,

Librarian, New York Entomological Society,

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Class I, HEXAPODA.

Order I, HYMENOPTERA.

TRICHOGRAMMA PRETIOSA RILEY. MISCELLANEOUS HABITS OF THE ADULT, WITH A LIST OF HOSTS.

By A. Arsène Girault,

Washington, D. C.

The following is a conclusion of the publication of observations made on this egg-parasite during the Cotton Bollworm Investigations in Texas in 1904 by the National Bureau of Entomology. The more important of these have already been published, or presented for publication, and this brief paper records especially those details of its life-history which are of minor consideration or of interest solely from the biological standpoint. The observations were made at Paris, Texas, latitude 33° 45′, and the host was *Heliothis obsoleta* Fabricius, the common bollworm of cotton.

Emergence. — The little parasites issue from the host eggs as adults through one or several holes cut by their jaws generally in the upper side of the egg. The hole is usually rounded in outline, but with jagged edges. Quoting from a general note made in 1904: "Out of 36 cases of emergence, 32 were from single holes in various parts of the host egg; the remaining 4 were from 2 holes in the host. In the latter cases, in 2 hosts, there were 2 large, equal, round holes, side by side in the upper end; in the third, 2 unequal round holes, one on each and opposite sides of the host, and in the fourth case, exit was made through a small round hole at apex and a large jagged rent in the side near base. As 83 parasites issued from these 36 hosts, it is evident that in the majority of cases more than 2 came from a single host, using a common exit-hole."

Additional records obtained for 45 hosts from which more than one parasite issued showed that but 5 or 11 per cent. made their exit through more than one hole; the remaining 89 per cent. emerged through single exit-holes. The hosts in this case averaged about three parasites apiece.

The position of the exit-hole varies. They may involve the micropyle of the host egg, or be near the base, but as stated are generally in the upper half of one side, or near the middle of the side. Their shape varies from small, almost perfectly round holes just the size of the parasite's body, to large, irregular, jagged ones, but is normally a mean between these two extremes. Exceptionally, an exit-hole may involve the whole of one side of the host egg. When the parasites issue from a single host through several holes, usually 2, they are as a rule smaller and round, and in the upper side of the egg. They may or may not adjoin, for instance may be on opposite sides of the host, or all grouped together at the micropyle but separated one from the other. Their method of issuing from the eggs of *Alabama argillacea* Hübner is about the same.

"*Brachypterous*" *specimens.* — Riley (1885) in writing of this species mentions what he probably supposed to be true brachypterous specimens, but which must have been very recently emerged ones, which have the wings folded in dark squares over the back. On June 30, I noted this to be the case with two males and five females issuing at 2 P. M., and in the autumn, many recently emerged specimens were found with the wings in that condition. Naturally at that time of the year they would be noticed more for the reason that it took a much longer time for them to spread. A single "short-winged" female was captured just as it issued from an egg of *Alabama argillacea* Hübner on a cotton leaf, at 11 A. M., October 23, 1904. The wings were unspread and folded so as to "resemble paddles" (Riley, 1885). It was taken to the laboratory and confined in a small glass vial, but up to 6 P. M. had not changed. However, on the following morning, it was found with normally spread wings. Two specimens issuing on the morning of November 1 had their wings similarly folded and which became normal by the following morning, and this was repeated in the case of numerous specimens emerging on the morning of November 4.

Habits. — Although the parasites occur in great numbers, on account of their minute size and inconspicuousness, they are rather difficult to find in nature. For this reason their natural habits in regard to activity are more or less unknown, except in the case of ovipositing females.

They have been observed crawling over the leaves of corn and cotton, mostly in the morning of fair and clear days, but have never been observed to feed on the secretions of leaf glands as do various of the Chalcidoidea. In the laboratory, however, they have been fed on ripe peach juice and a diluted water solution of brown sugar, sometimes feeding rather eagerly, but mostly quite incidentally, and in one case, not at all. The taking of food seems to have no effect on the length of life.

In regard to the latter, of course, we have nothing but laboratory records upon which to base conclusions. Through all of the breeding season of 1904 numerous specimens were kept under spacious glass jars, and their length of life noted. Summing up results, the average length of life was about 36 hours or slightly longer, but the range was from 12 to 108 hours. The longer period was very exceptional. The males die somewhat earlier than the females. The season of the year apparently has no effect on the length of life. Both sexes are very active and crawl rapidly and they also fly and are then very hard to see.

Percentage of Alabama eggs killed. — A few records, late in the season, were obtained for the percentage of the eggs of *Alabama argillacea* Hübner, the cotton caterpillar, killed by this parasite. On October 22, parasitized eggs were common on cotton but healthy eggs scarce. Forty-six (46) eggs collected from the leaves on that date showed by census 73.9 per cent. parasitism; by the end of the week following, the percentage for this lot was 76 per cent., another egg having since shown the characteristic blackened color.

The percentage of *obsoleta* eggs parasitized during 1904 has been given by Quaintance and Brues (1905).

List of hosts. — The genus *Trichogramma* confines its attacks mostly to the Lepidoptera, as far as our records go, but one species, *odontotæ* Howard, attacking the Coleoptera (*Odontota dorsalis* Thunberg), and one, *ceresara* Ashmead, known definitely to attack Hemiptera (*Ceresa bubalus* Fabr.), and two species attacking the Hymenoptera, namely, *minuta* Riley and *pretiosa* Riley. The latter species is known to attack members of two orders, Hymenoptera and Lepidoptera, and has quite a large number of hosts belonging mostly to the last named order. It was first recorded from *Alabama* and *Heliothis* and the genus *Pteronus*, and at present has been reared from the following hosts. — Lepidoptera: *Alabama argillacea* Hübner, *Autographa brassicæ* Riley, *Carpocapsa pomonella* Linn., *Heliothis obsoleta* Fabricius, *Ianassa lignicolor* Walker, *Laphygma frugiperda* Smith & Abbot, *Mamestra picta* Harris, *Phlegethontias sexta* Johanssen, *Platynota rostrana* Walker, *Polychrosis viteana* Clemens. — Hymenoptera: *Pteronus ribesii* Scopoli and doubtfully *Pachynematus palliventris* Cresson.

LITERATURE REFERRED TO.

1885. Riley, Charles Valentine. 4th Rep. U. S. Ent. Commission, Washington, p. 102.

1905. Quaintance, Altus Lacy and Charles Thomas Brues. Bull. No. 50, Bureau Ent., U. S. Dep. Agric., Washington, p. 116.

Class I, HEXAPODA.

Order IV, DIPTERA.

A NEW GENUS AND SPECIES OF SABETHID MOSQUITO.

BY FREDERICK KNAB,

WASHINGTON, D. C.

Dinomimetes, new genus.

Eyes contiguous; clypeus without bristles; antennæ very long, filiform, ciliate, the whorls inconspicuous, the second segment over fourteen times as long as wide in both sexes; metanotum with setæ. Prothoracic lobes well separated.

Dinomimetes epitedeus, new species.

Female: Antennæ, the tori small, globular, ochreous, naked; second segment extremely long; third segment about two-thirds as long, the following ones successively shorter; the segments are densely ciliate and bear many scattered long setæ; the second segment brown scaled. Clypeus elongate, conical, naked. Labial palpi moderately short. Occiput clothed with narrow pale brownish recumbent scales and a few scattered erect forked ones; along the posterior margin a dense confused row of erect forked scales. Prothoracic lobes prominent. Mesonotum brown, the scale vestiture bronzy brown, having two submedian bare stripes and with numerous coarse setæ, mostly in subdorsal and lateral rows, longest and most closely placed on the posterior portion. Scutellum distinctly trilobed, yellow-brown, with three patches of brown scales and groups of long coarse setæ on the lobes. Metanotum rather narrow, elongate, with a group of setæ near the apex. Postscutellum clothed with dull brown scales and with many pale setæ, somewhat produced at the middle where there is a double ridge of erect scales. Abdomen long and slender, blunt at the apex, the cerci small, slender and pointed. Vestiture of the abdomen above dull brown, beneath dull yellowish bronze. Wings rather broad, the scales of the veins brown and mostly narrow. Basal cross-vein slightly oblique, more than its own length behind the anterior cross-vein. Knobs of the halteres brown scaled. Legs brownish black, unicolorous. Claws small and simple.

Length of body, about 5 mm.; of wing, 4 mm.

Male: Very similar to the female. The antennæ even longer; the third segment hardly shorter than the second, the fourth but little shorter than the third; terminal segments much shortened. Palpi slender, about equal to those of the female in length. Abdomen subcylindrical, slightly expanded at the apex and with large very stout claspers. All the claws simple, those of the front and middle legs very long, those of the hind legs small.

Length of body, 4 mm.; of wing, 4 mm.

Locality. — Port Limon, Costa Rica (2 ♀♀, 1 ♂, F. Knab).

Type. — No. 10291, U. S. National Museum.

This mosquito has a deceptive resemblance to *Deinocerites cancer* Theob. and like it occurs in crab-holes. My remarks in Psyche, xiii, p. 95, on the occurrence of *Deinocerites cancer* at Port Limon apply to this species. At the time the article was written the specimens in question were in the hands of Mr. Coquillett and were not accessible for study.

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DEINOCERITES AGAIN.

BY FREDERICK KNAB,

WASHINGTON, D. C.

In Psyche for February, 1907, Miss Evelyn G. Mitchell, attempts to defend the subfamily Deinoceritinæ, erected by her in Psyche, xiii, 1906, pp. 11–21. The last article is so pretentious in character and presents such a mixture of ideas that it calls for some criticism.

I will first take up the larval characters of *Deinocerites* which are made use of by Miss Mitchell. While in her original article it is not directly stated that the "groove" is a unique structure, one is led to infer from her statements that this was her belief. What I asserted in my article on *Deinocerites*, Psyche, xiii, pp. 96–97, and still maintain, is that a mere matter of difference in size and shape of the structure in question can have no great systematic value. The "*angulation*" of the chitinous piece in question, which Miss Mitchell insists is such an important feature, is largely illusory. The figure of the under side of the head which I gave in Psyche was carefully drawn from a head in horizontal position and I believe is a correct representation of the head when thus viewed. When the larva is examined from above the head is deflected and the lobes projecting at the sides are seen in perspective and present the angular appearance noted by Miss Mitchell. It will be unnecessary to discuss at this time the mandibular structures of mosquito larvæ. I simply assert that the structures pointed out by Miss Mitchell are not of primary importance. If one adopted Miss Mitchell's method of classification, *Lesticocampa*, in which the larva has enormous maxillæ projecting far beyond the antennæ, shaped like mandibles and armed with several long sharp teeth, would on such a remarkable structure have to be removed from the Diptera altogether! Her simile in this connection of the tails of monkeys throws an interesting sidelight on her ideas of classification which would certainly astonish vertebrate zoölogists. Would she propose to remove the South American short-tailed *Brachyurus* from the Platyrrhine group and mercilessly throw it among the old world apes?

It will be as well, on this occasion, to dispose of Miss Mitchell's subfamily Psorophorinæ. *Lutzia bigoti* has a predaceous larva, in all the details of the mouth parts like that of *Psorophora*. But by no artifice can the adult of this mosquito be associated with *Psorophora*. It is only by the very large empodia that this form is generically separable from *Culex*, an adaptive structure to enable this large mosquito to rest upon the water. The larval structure is purely adaptive to habits and doubtless acquired quite independently.

But it is when we turn to the adult characters that the crudity of Miss Mitchell's ideas becomes most obvious. It is certainly a great wrong to Osten Sacken to misquote him in the manner she has. The striking differences in the antennæ of the Nemocera anomala from those of the true Nemocera lie in the brevity of the segments and the absence of the whorls of sensory hairs. Anyone who has examined the antennæ of a *Simulium* or a Bibionid will appreciate the difference. The antennæ of *Deinocerites* differ from those of most other Culicids merely in the greater relative length of some of the segments; as a result the whorls of hairs are less conspicuous, but present they are. How any member of so homogeneous and specialized a group as the mosquitoes can be considered "primitive," least of all one with such specialized habits as *Deinocerites*, is incomprehensible. Moreover a mosquito which has similarly elongated antennal segments but belonging to a distinct group, the Sabethinæ, and described in the preceding article, has recently come to light. Furthermore *Culex latisquamma* Coq. has a distinctly elongated second segment of the antennæ. As all three of these species live in crab-holes it becomes obvious that the lengthening of the antennal segments is not a "primitive" character but is correlated in some way to the mode of life of these mosquitoes. The attitude of alertness which these mosquitoes must maintain to avoid destruction by the excursions of their crustacean host may possibly account for the presence of this extra length of sensory surface.

Finally a fact bearing on Miss Mitchell's new classification of the Culicidæ by antennal characters. Unfortunately for her generalizations, in the subfamily Sabethinæ (Trichoprosoponinæ, Miss Mitchell) the genera *Joblotia* (*Trichoprosopon*), *Lesticocampa* and *Sabethes* have densely plumose antennæ in the male.

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Class I, HEXAPODA.

Order V, LEPIDOPTERA.

IN DEFENSE OF INCISALIA HENRICI.

BY PROF. JOHN H. COOK,

ALBANY, N. Y.

In the Entomological News for April (1907) Dr. Henry Skinner has published an article entitled "*Studies of Thecla irus Godart and T. Henrici Grote and Robinson*" in which he contends that "these two names represent one variable species." Having made an elaborate investigation of these butterflies, and having published* conclusions to which Dr. Skinner has taken exception, I feel called upon to make definite and detailed reply to the article in question.

The concluding sentence reads: "From *the evidence before me* I am convinced that *Thecla irus* and *henrici* are one species." Let us first inquire into the "evidence" presented in support of this contention.

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* Canadian Entomologist, Vol. XXXVII, No. 6 (June, 1905), p 216.

THE EVIDENCE PRESENTED.

Point 1. — In ¶ 1 (l. 7) Dr. Skinner writes : "I have never been able to make out two species, one for each of the above names." The argument is reinforced by repetition in ¶ 3 (l. 1). "If there are two species of *Thecla* found here (Philadelphia) that might be designated as *irus* and *henrici*, I have failed to discover the fact."

Both of these statements are obviously true but can hardly be raised to the dignity of evidence.

Point 2. — In ¶ 1 (l. 18) we read : "It would seem logical to think that *henrici* was believed to be a new species because it differed from the figure of *irus* given by Boisduval and Leconte. I do not believe that the authors knew any *T. irus* in nature."

I would point out that a belief is not evidence and that this "logical" inference is based upon a debatable major premise. But the whole question should be dismissed as irrelevant and beside the point. Inasmuch as Grote and Robinson have left us the type specimen, I fail to see how a knowledge of the psychology back of the original description of *henrici* can be of any assistance in an attempt to determine the validity of the species based upon that type.

Point 3. — In ¶ 3 (l. 6) there is given a partial list of the opinions which have been expressed by various writers on the group, W. H. Edwards, Herman Strecker, S. H. Scudder, and myself.

I pass by the exclusion of the expressed opinions of J. B. Smith, H. G. Dyar, W. J. Holland, and others "who have probably not investigated" the two names (*henrici* and *irus*) and confine myself to the point at issue. From the list given it appears that the division of opinion resulted in placing Scudder and Strecker on one end of the beam and Mr. Edwards and me on the other. Thus was equilibrium maintained until Dr. Skinner threw the weight of his authority into the balance, thereby lifting Mr. Edwards and myself high in the air.

I would timidly venture the assertion that the relative value of two opinions is not to be gauged by the number and prominence of the men who hold them so much as by the number and importance of the facts upon which they are based. I may point out in this connection that, of the four eminent gentlemen in the pans, Mr. Edwards alone has bred either species ; and that his more humble companion in the recent ascension has bred both species. The weights of opinions vary and it may be that the scales will respond to the specific gravity of the two unequal masses.

Point 4. — The alar expanse and the suffusion of the upper surface of the wings are stated (in ¶ 4) to afford no diagnostic characters.

With this I heartily agree; indeed pointed out the latter fact in the tenth paragraph of my former article (referred to above). What of it?

Point 5. — In ¶ 5 Dr. Skinner characterizes the stigma (which I made the basis of my definition of the species) as "a secondary sexual character that occurs in some males and not in others." In other words, if you mix peas and beans in a bag you will find that the bag contains both peas and beans. "This not only applies to *irus-henrici* but to some other species in the genus." We are here considering a concrete case and evidence concerning other species is inadmissible.* Let us avoid side issues. "It has no generic or specific value and is simply an individual variation." This is an opinion and again I would remind the reader that evidence is made up of facts not of opinions.†

Point 6. — ¶ 6: On the underside of the primaries the "line running from the costa to the first median nervule . . . has no specific value and no proper correlation with other so-called specific characters given by Mr. Cook"; and *point 7*, ¶ 7: concerning the variable color areas of the secondaries beneath "there is no correlation between any of these characters . . ."

Very well then, I stand corrected. My generalizations were drawn from such specimens as I possessed and for them held good. My series at the time numbered 63 *henrici* and 106 *irus*. Every experienced lepidopterist will recognize the difficulties attending an attempt to separate two species which closely resemble each other, by reference to any single feature of the wing ornamentation without considering other features. Especially is this so when one or both of the species is variable. In the present inquiry we have an unusually constant species (*henrici*) and a very variable species (*irus*). In my article (Can. Ent., June, 1905) I sought to indicate the principal characters which I had *always* found associated in *henrici*. I have not since found it necessary to modify my characterization of that species. My knowledge is confined to the 188 *henrici* in my own collection, the specimens in the New York State Museum, the Museum of Natural History (New York City), the National Museum, eleven private collections to which I have access, and a few individuals which I have sent to other collections. Still I am not wedded to the generalizations and am perfectly willing to abandon each and all of them upon the presentation of proper evidence; however — not otherwise.

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* I would find Dr. Skinner's statement of more value if he had printed the names of some of the *Thecla* which exhibit this peculiarity. I must profess the ignorance of one whose knowledge is limited and will be grateful for the facts. This is a request for information.

† I will gladly pay five dollars ($5) to anyone who will furnish me with a butterfly of the male sex, corresponding in essential points with Grote and Robinson's type *henrici*, which has a stigma. I will pay an equal amount for any male butterfly of the genus *Incisalia* (Minot) taken in the eastern United States or Canada, without the stigma and which does *not* agree in essentials with the above named type. This is not a reward; the amount offered represents simply the value to me for study of such specimens, if they exist.

Concerning the differentiating characters which I gave for *irus* I frankly admit that each may prove unreliable when considered alone* but I have yet to find a specimen which does not exhibit *some* of the differentiating characters. My examination has been confined to the material in the collections before mentioned, the J. A. Lintner Memorial Collection and 634 specimens in my own cases. It is by no means impossible that Dr. Skinner, with a larger or more complete series has been enabled to reach conclusions more valuable than those which I have published.

To sum up: points 1, 2 and 3 may be dismissed as irrelevant; point 4 is conceded, it has no weight as an argument; point 5 does not fall under the head of "evidence" — it is an opinion; points 6 and 7 are open to question. I would point out that Dr. Skinner's failure to find correlated differences among the butterflies does not prove that such differences do not exist; and *even if they did not exist, the main thesis* (that *henrici* is identical with *irus*) *would still be unproven.*

THE EVIDENCE NOT PRESENTED.

It may be pertinent also to examine the evidence which Dr. Skinner has withheld. In reply to the seven points of evidence which he has adduced in support of his contention, I would present seven other points as follows:

1. *Henrici* eggs differ constantly from *irus* eggs.

2. *Henrici* larvæ in the second stage differ constantly from *irus* larvæ in the second stage.

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* For instance the criterion of the projection of the basal-area (secondaries beneath) between the median nervules, has failed in four cases out of more than eight hundred — less than one half of one per cent.

3. *Henrici* larvæ in the third stage differ constantly from *irus* larvæ in the third stage.

4. *Henrici* larvæ in the final stage differ constantly from *irus* larvæ in the final stage.

5. *Henrici* chrysalids differ constantly from *irus* chrysalids.

6. *Henrici* "breeds true"; *henrici* ♂ mates with *henrici* ♀ and the progeny are *henrici.*

7. *Irus* "breeds true"; *irus* ♂ mates with *irus* ♀ and the progeny are *irus.*

Of these seven facts the first five were (or should have been) known to Dr. Skinner before the publication of his views in the Entomological News for April, for I communicated them to him early in February. The letter was enclosed in an envelope with my address printed in the upper left hand corner and has never been returned to me by the postal authorities. Even under the charitable assumption that this letter never reached its destination, Dr. Skinner can hardly plead that the facts were unknown to him without laying himself open to the charge of culpable ignorance of the literature of his subject, for W. H. Edwards published the life-history of *henrici* more than twenty-five years ago* and the life-history of *irus* appeared in the Canadian Entomologist in 1906.†

Three hypotheses may be entertained in an endeavor to account for Dr. Skinner's attitude: (A) he has ignored the above facts — in which case his argument is unscientific, for it is surely unscientific to suppress evidence that does not square with a preconceived notion; (B) he doubts the facts — which is discourteous as well as unscientific; or (C) he has chosen to interpret them otherwise than as establishing the specific validity of Grote and Robinson's *henrici* — which is merely absurd.

NOTE BY THE EDITOR.

The distinctness of these two *Thecla* is proved on the adult characters adduced by Professor Cook. The stigma of the male being present in one and not in the other. This is, as Dr. Skinner says, a secondary sexual character; but it is of absolute specific value. It has generally been used as of generic value, and the reason we agree with Dr. Skinner that it should not be so used, is not because it is variable or inconstant, which is not the case, but because as a matter of policy and choice we prefer to found genera on characters exhibited by both sexes. Many will not take this view. In fact most of the families of North American Lepidoptera have been heretofore classified on secondary sexual characters. In this view, our two *Thecla* are not only specifically, but generically distinct. Of course, the larval differences are additional proof, if any were needed. We infer that Dr. Skinner, not having studied the larvæ, has supposed that their characters were negligible.

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* Papilio, I, 150–152, Oct., 1881.

† Vol. XXXVIII, No. 5 (May), p. 141 and No. 6 (June), p. 181.

SOME NEWFOUNDLAND GEOMETRIDÆ, WITH DESCRIPTION OF A NEW VARIETY.

By Louis W. Swett,

Bedford, Mass.

In collecting a series of the common *Sciagraphia granitata* Gn. I was struck with the great diversity of coloration and markings, the colors varying from violet gray, yellowish, dark olive, light gray to pure silvery white and some with brick red markings. In a lot from Newfoundland, through the kindness of Mr. Owen Bryant, I found three of a very distinct form differing from any of the numerous descriptions and from others from the same locality. At first I feared to describe them, as there are so many synonyms in this group, but after reading through all the descriptions I find certain features which make these very distinct. The only description that at all approaches this variety is *submarmorata* Walk. (Cat. Brit. Mus., p. 887, vol. 23, 1861), but the markings and color of lines render it distinct. Below I append my description.

Sciagraphia granitata, var. **oweni, new.**

Expands 1.2 inches. Color above silvery white with very large black dots and wide smoky black lines. On costa, four black patches more lengthened than usual, white between. Basal line of fore wings smoky black (width of the body) showing in three prominent spots. Mesial band smoky, straight at costa, wider than on inner margin, including black distal dot, the black dots show plainly on veins. Beyond discal dot a narrow white sinuate line bordering the very broad smoky band which runs almost straight from black apical patch to inner margin, widening after spot between veins 3 and 4 as it approaches. Beyond this the border is marbled with black and white striations (more marked than inside mesial band) sometimes running into cloudings. The veins at base of fringe marked with small dots. Hind wings heavily powdered with black and white atoms, basal smoky line straight, discal line large and black, then an extra discal smoky line running from anal angle high up on outer margin, more so than usual. Beneath more striking, white and black striations, legs black, marbled with white, body also; no ochreous markings as in *submarmorata* and most of the other synonyms. Basal and mesial bands very wide, merging near inner margin, black discal dot, then, smoky marginal band containing black patch in middle. Hind wings, basal line more sinuous than above, wide, smoky black; very prominent discal spot, a faint mesial line, then wide smoky black submarginal band, beyond marbled with black and white.

Grand Lake, Newfoundland, August.

This variety may be distinguished from all others by prominent black spots on fore wings with wide smoky black bands (not ochreous lines or bands as in most others) black and white body and legs. Described from 3 ♂♂, one in my own collection, one in the National Museum, Type No. 10275, the third in O. Bryant's collection. Besides this interesting variety Mr. Bryant turned up the following species:

1. *Lobophora nivigerata* Walk.
2. *Venusia cambrica* Curt.
3. *Eustroma destinata* var. *lugubrata* Mösch.
4. *Rheumaptera hastata* var. *mœstata* Nolck.
5. *Rheumaptera sociata* Bork.
6. *Rheumaptera luctuata* D. & S.
7. *Rheumaptera luctuata* var. *concordata* Walk.
8. *Mesoleuca silaceata* Hüb.
9. *Hydriomena magnoliata* Gn.
10. *Hydriomena magnoliata* var. *cumatilis* G. & R.
11. *Xanthorhoë abrasaria* H.-S.
12. *Xanthorhoë convallaria* Gn.
13. *Leptomeris frigidaria* Mösch.
14. *Sciagraphia granitata* Gn.
15. *Sciagraphia granitata* var. *oweni* Swett.
16. *Sciagraphia neptaria* Gn.
17. *Cymatophora inceptaria* Walk. ?

This is not intended to be a complete list but just to show what species would be commonly met with. The other Newfoundland specimens of *S. granitata* correspond to Packard's variety *sexmaculata*, being stunted and olive gray; but it would be useless to attempt to separate these synonyms without comparison with Walker's types as well as the others. I wish to thank Dr. Dyar for specimens and advice; also Mr. Grossbeck for comparisons.

A CORRECTION OF SOME RECENT SYNONYMY IN THE GENUS THECLA.

BY HARRY COOK,

ALBANY, N. Y.

Dr. Henry Skinner, of Philadelphia, has lately (Ent. News, Feb., 1907, p. 47), appeared in print with an article noticeable for the strangeness not to say weirdness of the theories advanced. Dr. Skinner, it seems, lately secured some seventy-three specimens of *edwarsi* and *calanus* and, being unable to divide them to his own satisfaction, jumped to the conclusion that they were one and the same species. This conclusion would have been entirely harmless had it not been published. But a printed article bearing such a well-known name as that of Dr. Skinner may lead some astray and so it seems well to call attention to a few facts. In the first place Dr. Skinner divided his specimens on a basis of color, which is no basis at all, unless one has perfectly fresh specimens, as these frail butterflies weather quickly. Of course, this basis gave no results. It could not be expected to. He then considered the extra mesial band on the underside of the primaries which is one of the distinguishing characters, but found "absolutely no differential characters in it." His investigations at this point could hardly have been very thorough for by this band, and its continuation on the secondaries, the two species are with a little practice, readily separated. I have taken as many as one hundred in a day of these little *Theclas* and never found any that could not be easily determined.

It would be well for Dr. Skinner to consider also the larval, pupal and egg stages of these insects before he makes a final determination of the affair. The larvæ he will find quite distinct and, in this locality at least, they feed on wholly different trees. *Edwardsi* eats oak while *calanus* prefers hickory and butternut.

In a footnote on page 45 of the same issue of the News, Dr. Skinner states as his opinion that *Incisalia irus* and *I. henrici* are one and the same. Another extraordinary discovery! The Doctor this time does not enlighten us as to how he came to his conclusions. Probably he did so through a superficial examination of the imagines. I should like to call his attention to the original descriptions of these two butterflies, not to the pictures. If one has a series of the two species they can be readily divided by closely following these descriptions. Also an article in the Canadian Entomologist, Vol. XXXVII, No. 6, p. 216, may help to orient one unused to the genus. The larvæ chysalids and eggs of these two species also are very distinct. Of course no one denies that these species are closely allied, as also are *calanus* and *edwardsi*, but their distinctive characters are permanent and stable from generation to generation and appear in all the stages from the egg to the imago. Some of the members of the genus *Thanaos* are much more confusing than the *Theclas* here referred to but their validity as separate species is unquestioned. The true test of the identity of species is found in breeding. Let Dr. Skinner breed a few of these butterflies and then let us hear his conclusions. However he should not despair. I remember distinctly when I, as a boy, was quite convinced that *Argyunis cybele* and *A. atlantis* were identical and that all preceding entomologists were entirely wrong. Such ideas should be kept secret until one has facts wherewith to prove them. Any premature disclosure of one's psychical processes without sufficient facts or adequate logic to substantiate them is unfortunate as it tends to mislead the inexperienced beginners and confuses the literature of the subject.

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DESCRIPTION OF A VARIETY OF AUTOMERIS IO, FAB.

BY CHAS. H. LUTHER, JR.,

PROVIDENCE, R. I.

Automeris io, variety fuscus, new.

Male. Expanse of wing 2″ to 2⅜″. Head, antennæ, thorax, abdomen, legs and ground color of wings a bright yellow. Discal markings on the fore wings in the form of an irregular broken oval with a dot in the center. Large eyes and broad yellow marginal bands on the hind wings.

Female. Expanse of wing 2¾″ to 3⅛″. Head and thorax dark brown. Antennæ, abdomen, legs and under-surface of wings brick color. Markings on the upper surface of fore wings pronounced, the whole having a general rich dark brown effect. Ground color of hind wings, dark yellow with large eyes.

Habitat. — Providence and Cranston, R. I.

Eggs. — First all cream color. At the expiration of two days a blue spot appears at the top of the eggs.

Larva. — First dark brown. Later some are brown and some are green, with the usual *io* markings and spines.

Food plant, *Baptisia tinctoria.*

Pupa and cocoon same as the usual forms. The first specimen of this variety of *A. io*, found by me was a female which I now have in my collection. The second was also a female which I secured alive July 3, 1906, and from which I got about ninety-five eggs. From these eggs I received about the same number of larvæ which I fed on wild cherry. The larvæ all lived until after the second molt, when all of them died, apparently from some bacterial disease or on account of wrong food plant. July 14, 1906, I found a brood of twenty-nine *io* larvæ on *Baptisia tinctoria*, which I fed on this food plant. In September, 1906, I got from the cocoons under usual conditions, five males and two females. I am now getting, February, 1907, some specimens of this variety by forcing the same.

Type. —No. 10274 in the U. S. National Museum.

◆

A GENUS AND SPECIES OF GEOMETRIDÆ NEW TO NORTH AMERICA.

By Richard F. Pearsall,
Brooklyn, N. Y.

The genus *Trichopteryx* Hübn. has not before been represented in the North American fauna, though several species are found in Europe. In a recent "List of British Columbian Lepidoptera," the Geometridæ were arranged by Rev. Geo. W. Taylor, who places under this genus *Nyctobia viridata* Pack. (*Agia eborata* Hulst.); but it cannot rest in the genus for reasons I have stated in a paper on the genus *Nyctobia* Hulst., awaiting publication. The type of *Trichopteryx* is *carpinata* Bork., in the ♂ of which vein 8 of hind wings is connected by a bar with cell, near the cell's end, and in *viridata* it is united with it for nearly the cell's length. The genus is thus characterized.

Trichopteryx Hübn.

Type *carpinata* Bork.

FIXED.	VARIABLE.
Antennæ, flattened, slender.	*Thorax*, with low tuft posteriorly.
Palpi, short.	*Abdomen*, not tufted.
Front, protuberant, smooth.	*Venation of hind wings*, ♂, six and seven widely separate. Three and four
Tongue, developed.	

Fore tibiæ, unarmed.
Hind tibiæ, end spurs only.
Hair pencil in ♂, present.
Hind wings, vein five present, vein eight in ♂ runs parallel with cell and joined to it near end by bar, then rapidly divergent, ♀ anastomosing with cell nearly cell's length.

separate, two very short, one absent — an inflated fold on inner margin at base.
♀ all veins present, six and seven long-stemmed, three and four separate.
Accessory cells, two.

Trichopteryx veritata, new species.

♂. — Fore wings broad, extended at apex. Hind wings small, narrowed, much rounded. Front of dark brown, mixed with white scales. Head and thorax above dark brown and ashen. Fore wings pale silver-gray. The basal line shaded outwardly with dusky runs straight across wing from costa, ending at inner margin twice as far from base, the enclosed space paler than the rest of the wing. Intra discal line is geminate, dark gray, waved, and runs straight across wing from costa, about two fifths out, darkest at costa and on veins, preceded by a geminate pale line. The extra-discal, a broad shade-line, darkened on veins, starts from a square dark gray patch on costa, curves slightly outward at cell, otherwise parallel to intra-discal, the space between them pale. A subterminal dusky shade-line starts from costa half way from extra-discal to apex, preceded by a geminate pale line, and is sharply defined inwardly by a black wavy hair-line, parallel with extra-discal. Outwardly to border, dark gray, centrally traversed by an ill defined whitish hair-line. A black terminal line interrupted between the veins. Fringes dusky white. Hind wings clear white, with narrow dusky marginal line. Discal dots faint points on all wings. Abdomen and legs dusky white, the former with each segment narrowly bordered with black on posterior edge. Beneath pale silver-gray, a few dark scales costally on fore wings and the shade-lines above showing faintly. Discal dots faint.

The ♀ is darker, more brownish, the lines well defined. The hind wings are decidedly dusky, with a well marked geminate subterminal line, darker than ground color of wing, preceded by a geminate pale line parallel with the strongly rounded outer margin, which is darker, with the fringes long and dusky. Beneath darker than in ♂ with the body browner, obscuring the black rings on abdomen above. No discal dots on wings above or below. Expanse, 20 to 22 mm.

The ♀ from Pasadena, Calif. (Mar. 3, 1902) has been in my possession nearly two years, through Mr. Geo. Franck of Brooklyn.

The ♂ is a recent acquisition from San Diego Co., Calif. (Feb. 15, 1906) through my friend Mr. H. W. Marsden.

Types. — ♂ and ♀, coll. R. F. Pearsall.

NEW GENERA AND SPECIES OF AMERICAN MICROLEPIDOPTERA.

BY AUGUST BUSCK,

WASHINGTON, D. C.

Polychrosis carduana, new species.

Labial palpi reddish, rusty brown, touched at the tip with black. Face, head and thorax rusty brown, top of head and middle of thorax sprinkled with black. Fore wings dark velvety brown mixed with golden ochreous scales and with extensive markings of dark metallic blue as follows: a large basal patch more or less streaked with the ground-color; an outwardly oblique blue fascia before the middle of the wing, terminating in a large nearly circular bluish yellow spot, touching the dorsal edge; another outwardly oblique fascia from apical third of costa, which is narrowed on the middle of the wing and below this divides into two more or less crooked branches, which reach the dorsal edge; both of these blue fasciæ are emphasized on the costal edge by two pairs of short yellow streaks, separated by a longer black streak; three more similar pairs of short yellow streaks on the costa beyond the second fascia start narrow blue lines which run together in a small fascia across the tip of the wing just before apex; three rather indistinct, small, round, metallic blue dots on lower part of termen; cilia dark metallic blue. Hind wings dark bronzy brown with costal edge white and cilia bluish. Abdomen dark purplish brown; anal tuft yellowish. Legs dark purplish brown; tarsal joints with yellowish annulations. Pterogostic and oral characters typical. Alar expanse: 10.5–12 mm.

Food plant: *Carduus.*

Habitat. — Hyattsville, Maryland.

Type. — ♂ and ♀, U. S. Nat. Mus., No. 10159.

Described from some thirty bred specimens. The larvæ are semi-social and feed in numbers, more or less exposed in a light common web in the tops of thistle; they are light greenish yellow with blackish brown head and thoracic shield and with shining black tubercles, which give them a very pretty dotted effect. On maturity they spin a piece of the leaf into a small roll for a cocoon; the moths appeared early in August.

This is the largest of the hitherto described American species of this genus, being especially more broad-winged than the others and is easily distinguished from all the others by the ochreous round spot on the middle of the dorsal edge.

Hendecaneura (?) fraternana, new species.

Labial palpi ochreous fuscous, sprinkled with darker fuscous, especially on tip of second joint; terminal joint blackish. Face and head dark ochreous brown, on the top of the head mixed with white. Thorax dark ochreous fuscous, each scale ghtly tipped with white. Ground color of fore wings whitish but so strongly overd with dark fuscous and ochreous scales as to produce a marbled effect; at basal rd is a dark fuscous broad irregular transverse fascia, outwardly angulated on the ddle and edged with black scales; the basal space inside this fascia is strongly erlaid with dark fuscous; following the fascia is a central whitish space relieved thin undulating transverse dark fuscous lines. Just before tornus is a large dark reous fuscous, black-edged dorsal spot, rounded towards the base of the wing d with the protruding outer corner pointed towards apex; above this spot is a arly semicircular spot of the same color and also black-edged. The apical third of wing is covered with grayish ochreous scales, tipped with white, and contains a orly defined ocelloid spot, consisting of two silvery white patches, the outer one of ich is preceded by a short black dash. Costal edge has the short fold at base rk fuscous and has five pairs of short oblique white dashes on its outer half. Apex wn, cilia white, sprinkled with fuscous. Hind wings dark ochreous fuscous with edge darker and with a dark fuscous line on the base of the whitish cilia. Alar anse: 19–22 mm.

Habitat. — West Riverside, California, October, November.

Type. — ♂, U. S. Nat. Mus., No. 10317. Wing-slide, in Lord alsingham's collection.

This and the following species are those referred to by the writer the meeting of the Entomological Society of Washington, October, 06.

They differ from Lord Walsingham's description of the genus ly in having veins 6 and 7 of the hind wings truly stalked instead "nearly coincident along their base," diverging at about one third ir "length."

If I am right in placing these species in *Hendecaneura* I should pect that the other species of the genus will be found to have these ins truly stalked, and should rely on this quite uncommon character thin the subfamily in the definition of the genus rather than on the cual dimorphism in the venation of the forewing; but as I am at esent only acquainted with the genus through Lord Walsingham's deiption and as some deviations from this are apparent, the generic de mination of this and the following should be taken as tentative only.

ndecaneura (?) filiana, new species.

Labial palpi dark ochreous, terminal joint brown. Face and head unicolored, ll ochreous; thorax ochreous. Fore wing light ochreous with an ill-defined slightly rker ochreous basal patch covering the basal third; the acutely angulated outer ge of this patch protrudes into the middle of the wing. Costal fold dark fuscous. the end of the cell is an indistinct darker ochreous spot and below it is a similarly ored ill-defined dorsal patch; these and other markings on the apical part of the ng are very indistinct, but produce the same general pattern as in the foregoing species. Apical third of the wing is irregularly overlaid with light fuscous, white-tipped scales. Costal edge narrowly dark brown with very indistinct pairs of short white dashes; just below apex is a larger white dash. Cilia fuscous. Hind wings dark ochreous fuscous. Posterior legs unmottled ochreous; anterior and middle legs with tarsi annulated with black. Alar expanse: 26 mm.

Habitat. — West Riverside, California, October.

Type. — ♂ U. S. Nat. Mus., No. 10318. Wing-slide, in Lord Walsingham's collection.*

Gelechia catalinella, new species.

Labial palpi pure white with base of second joint black externally. Tongue sparsely clothed with black scales. Antennæ purplish black. Face head and thorax pure white; patagiæ black. Fore wings unicolored blackish brown, with a purplish sheen and with striking pure white markings as follows: entire dorsal edge from base to tornus white; an outwardly oblique costal streak at basal third, reaching the middle of the wing; a narrow perpendicular transverse fascia at apical third and an inwardly oblique curved costal streak just before apex. Hindwings dark blackish fuscous, basal half of costa light silvery gray. Abdomen purplish black. Legs dark purplish brown with white spurs and broad white annulations on tibiæ and tarsi. Alar expanse: 20 mm.

Habitat. — Catalina Springs, Arizona; August.

Type. — U. S. Nat. Mus., No. 10319. Cotype in collection of Dr. Wm. Barnes, from whom I received this species.

This very striking species comes nearest *Gelechia paulella* Busck; it has however a more blackish ground color and is easily distinguished by the different white wing-ornamentation.

Glyphidocera dimorphella, new species.

Labial palpi straw-yellow, lightly mottled with black scales. Antennæ yellowish fuscous, simple in both sexes, without the notch found in the males of some of the species of this genus. Head and thorax clear straw-yellow. Fore wings light straw-yellow, sparsely sprinkled with dark brown atoms, with a blackish brown round dot on the middle of the cell, another similar dot at the end of the cell and a more or less complete series of blackish brown dots along terminal edge of the wing. Cilia whitish. Hind wings light straw-colored. Abdomen yellow. Legs light yellow with darker, blackish, spurs and tarsi. Alar expanse: 10–11 mm.

Habitat. — Plummers Island, Md. (in the Potomac River above Washington City). (Busck.)

Type. — U. S. Nat. Mus., No. 10320.

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*Since the foregoing was written I have received the opinion of my friend Mr. J. Hartley Durrant, who after examination of my slides does not believe these two species can be properly included in *Hendecaneura*. I am at present unwilling to venture the erection of a new genus in this subfamily even if such eventually shall prove necessary; but there will be no difficulty in locating the species generically by their peculiar venation, whenever the generic revision of the family shall be published, as now seems near at hand.

This and the two following species differ somewhat in venation from the definition of the genus as given by Lord Walsingham and in my *Gelechia* revision (page 916). But they are undoubtedly properly referable to that genus, the scope of which is thus somewhat widened.

These three species all have veins 7 and 9 in the forewings stalked instead of separate as in the hitherto described species of the genus and none of them possess the notched antennæ in the males as is found in the type of the genus.

The present species has vein 4 out of the stalk of veins 2 and 3 in the forewings as in the genus *Brachmia*.

One of the specimens of which I made a slide shows an abnormality which gave me considerable trouble, before it was rightly interpreted for me by my esteemed friend Mr. Edw. Meyrick. It had apparently 12 perfect veins in the forewings instead of the 11 veins normal to this genus (vein 8 being absent, coincident with 7) and the position of the additional vein, which I presume was the normally obsolete vein, out of vein 6 and ending in the terminal edge below apex, gave me, I thought, a clue to another explanation of the venation in this group, which would have excluded it from the family Gelechiidæ.

Fortunately I sought the help of Mr. Meyrick, sending him slides and specimens and this master mind at once cleared the difficulties, pointing out, that the bifurcation of vein 6 has nothing to do with vein 7, but is merely an abnormal fission; Mr. Meyrick writes that he has observed similar fission of veins in quite a number of instances in other Lepidoptera, where there was no other possible explanation, all the usual veins being present as well; * but he does not know a single case of such a structure having become normal in a species, though similar fission of other structures, *e. g.*, of stamens in flowers is admittedly often established and normal as is proved in such cases by study of embryonic development.

I wish here once more to acknowledge publicly my great indebtment to my learned friend, Mr. Edw. Meyrick, whose profound knowledge and most liberal assistance has again and again helped me over difficulties, which I could not have managed alone.

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* Two such cases are recorded by the writer (Proc. U. S. Nat. Mus., Vol. XXVII, pp. 746–747, 1904); one being a specimen of *Hemerophila alpinella* Busck, which had nine veins in the right hindwing, and the other a specimen of *Scardia fuscofasciella* Chambers, with thirteen veins in the left forewing.

Glyphidocera meyrickella, new species.

Labial palpi ochreous, terminal joint slightly mottled with black on the inner side. Antennæ light ochreous, annulated with black. Face, head and thorax ochreous. Fore wings ochreous, evenly and profusely sprinkled with black scales; a blackish discal spot on the middle of the cell and another at the end of the cell are larger and more diffused than in the foregoing species from which the present species also differs by its larger size and by the lack of terminal black spots. Alar expanse: 14–15 mm.

Habitat. — Plummers Island, Md. (Busck).

Type. — U. S. Nat. Mus., No. 10321.

This species has vein 4 of the forewing approximate to 5, not connate with or out of vein 2. I had originally supposed it to be the female of the preceding species, but the distinct venation alone proves it a separate species, and I possess both sexes. I take pleasure in permanently associating Mr. Edw. Meyrick's name with this species, the more so, as he corrected my first impression and called my attention to the distinctness of the species.

Glyphidocera aberratella, new species.

Labial palpi ochreous, strongly overlaid with black scales. Antennæ dark fuscous, simple in both sexes. Face, head and thorax dark ochreous fuscous. Fore wings with the ochreous brown ground-color heavily overlaid with black scales especially along the edges and towards apex. At the end of the cell is a poorly defined blackish dot and on the middle of the fold is a similar dot. Hind wings bluish fuscous; cilia yellowish. Abdomen blackish fuscous. Legs yellowish, strongly sprinkled with black. Alar expanse: 14 mm.

Habitat. — Plummers Island, Md.

Type. — U. S. Nat. Mus., No. 10322.

The venation of the fore wing of this species differs from that of the type of the genus in having veins 8 and 6 short-stalked, enclosing apex, but I do not consider this of generic importance in the present case. The peculiar labial palpi, the very striking venation irrespective of this variation and the general habitus plainly indicate the generic position and prove the aberrations in the venation as well as the secondary sexual character of the antennæ found in some of the species to be merely of specific value.

Epicallima edithella, new species.

Labial palpi golden white. Face white. Antennæ bronzy black. Top of head and thorax dark bronze. Fore wings dark bronzy brown with golden yellow and silvery white markings, as follows: at basal fourth is a transverse perpendicular silvery fascia, somewhat dilated on dorsal edge; at apical third is a similar fascia which does not quite reach costal edge and which is interrupted in the middle by the longitudinal golden yellow marking. Midway between the two fasciæ are three short longitudinal parallel silvery streaks, one just below the costal edge, the other two closer together on the middle of the wing. Between and broken up by these silvery markings, which all are edged with dark scales is a large, diffused, longitudinal, golden yellow spot reaching from base to beyond the end of the cell, confined to the upper half of the wing, but at no place touching the costal edge. Cilia dark brown. Hind wings dark bronzy brown. Abdomen bronzy with anal tuft silvery. Legs silvery, indistinctly barred with black. Alar expanse: 9–10 mm.

Habitat.— Center Harbor, New Hampshire. (H. G. Dyar, coll.)

Type. — U. S. Nat. Mus., No. 10323.

This pretty little species is nearest to *shalleriella* Chambers, which species also belongs in *Epicallima* though aberrant in having veins 7 and 8 in forewings united instead of merely stalked as is the case in the type of the genus. *Shalleriella* is a larger species differing somewhat in wing-ornamentation, notably in the possession of the white costal spot before apex and the black-silvery ocellate spots on dorsal edge.

The genus *Epicallima* differs from *Borkhausenia* mainly in the absence of pecten on the basal joint of the antennæ. Mr. Edw. Meyrick has lately recorded two species of this genus from Ceylon.

Colinita, new genus.

Type. — *C. sponsella* Busck.

Labial palpi long, recurved, smooth, pointed. Tongue very long, stout, scaled at base, coiled. Maxillary palpi obsolete. Antennæ simple, basal joint enlarged, with pecten. Head and thorax smooth. Forewings narrow, elongate pointed, more than four times as long as broad, smooth scaled. 12 veins: 7 and 8 stalked; 7 to termen; 3 and 4 short-stalked, 5 approximate to or out of base of 4; 3 with a strong tendency to become obsolete; *1b* simple at base; *1c* strongly developed. Hind wings somewhat narrower than the forewings; costal edge nearly straight; termen slightly sinuate; apex pointed; 8 veins; 2, 3 and 4 distant, nearly parallel; 4 and 5 short-stalked; 6 and 7 parallel; 8 free.

Posterior tibiæ clothed with rough hairs above.

The pectinated basal joint of the antennæ, the separate veins 6 and 7 in the hindwings and the hairy posterior tibiæ place this genus in the family Blastobasidæ, though the stalked veins 4 and 5 and the separate veins 3 and 4 in the hindwings are heterogenous in this family and suggest relationship with some of the Yponomeutidæ.

Colinita sponsella, new species.

Labial palpi whitish gray with a broad black annulation on the middle of second joint and another on the middle of terminal joint. Face, head and thorax whitish gray, mixed with black scales. Ground color of fore wings dirty white sprinkled with dark fuscous brown scales; they congregate before the middle of the wing into an imperfect, curved, transverse fascia, before which is a nearly immaculate white area and beyond which the dark scales form poorly defined, irregular, longitudinal lines, meeting at apex. Hind wings yellow with light yellow cilia. Abdomen dark fuscous. Legs pepper and salt colored. Alar expanse: 20 mm.

Habitat. — Yuma Co., Arizona. Desert.

Type. — U. S. Nat. Mus., No. 10324.

To this genus belongs also *Colinita arizoniella* Kearfott, described as *Holcocera* (Can. Entom., XXXIX, p. 8, 1907). This is a smaller unicolored white species.

Dyotopasta, new genus.

Type. — *Plutella yumaella,* Kearfott.*

Head with rough scales. Labial palpi long, curved; second joint with rough scales above, towards the face and with a few lateral bristles; terminal joint short, blunt, porrected. Tongue and maxillary palpi obsolete. Antennæ little more than half the wing length, simple, with the somewhat enlarged basal joint thickly clothed with scales. Ocelli large, in front of the base of the antennæ. Thorax smooth. Fore wings elongate, three and one half times as long as broad; apex rounded; costal edge nearly straight; dorsal edge evenly rounded and slightly sinuate at the end of the cell. 12 veins, all separate; 7 to apex; 2 from shortly before the end of the cell; internal veins from between 10 and 11 to below 8 and from base to above 5; 1*b* strongly furcate at base. Hind wings broader than fore wings; costal edge deflected at apical third; termen strongly oblique and slightly sinuate. 8 veins; 3 from corner of cell; 4 distant, parallel with 3; 5 and 6 shortstalked; 7 parallel to 6; 1*b* furcate at base; 1*c* present.

I have long had this genus and its type in manuscript as has also Lord Walsingham, from whom I lately have received a specimen, bearing an appropriate generic name, which I was tempted to adopt. I should have preferred to await Lord Walsingham's publication of the genus, but the premature description of the type under a wrong generic name in another family makes it desirable to have its proper generic position published without further delay.

The genus looks superficially much like *Xylesthia* Clemens, to which genus it comes near, though differing in the lack of maxillary palpi and in the form of the labial palpi.

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* Can. Entom., XXXIX, p. 6, Jan , 1907.

NOTES ON SOME AMERICAN NOCTUIDS IN THE BRITISH MUSEUM.

By JOHN B. SMITH, Sc.D.,

NEW BRUNSWICK, N. J.

In Vol. XII of the Journal N. Y. Ent. Soc., pp. 93–104, 1904, I published a review of Vol. IV of Catalogue of Phalænæ, etc., then recently issued. This volume, the first of the series on the Noctuids, by Sir George F. Hampson, contained some changes in the accepted synonymy as based on previous studies and comparisons. I was not quite ready to accept all of these references of species nor the use of genera in the way Hampson typified them. As to the genera the difference is due to the fundamental rule accepted for the determination of generic types and agreement cannot be reached until a uniform basis is agreed upon by zoölogists. As to the species it was matter for further study of the original types. In September, 1906, it was my good fortune to be able to spend some time in London; for a week I went over the Noctuid collection, and Sir George was good enough to look over with me all those species about which our conclusions were at variance. Taking up the species in the order of my notes, the following memoranda were made.

Pyrocleptria californica Hamps. This is *Annaphila aurantiaca* Hy. Edw. That the species was not an *Annaphila* I pointed out in my Catalogue of 1893 and also stated that it was an Heliothid for which I had no satisfactory place. In 1895 Mr. Grote created his genus *Incita* to receive it; but evidently without specimens and without recognizable description. At any rate *aurantiaca* is type of *Incita* Grt., and so the species must be known, with *californica* Hamps., as synonym. The type of *Pyrocleptria* is *cora* Gn., and if that species is really congeneric with *aurantiaca* the name *Pyrocleptria* must sink as a synonym of *Incita*.

Heliothis lupatus Grt. This is the *Xestia chloropha* of Hubner without very much doubt, and it disposes of another of those miserable species that have remained so long unidentified in our catalogues. Hampson first suggested this synonymy in a letter and after comparing my only specimen with the figure, I have no doubt that he is correct. I am not aware that he has published the reference, but the credit for it belongs to him at any rate. The species is not at all common in my experience and has been in our lists as an *Orthosia*. It must in future be *Heliothis chloropha* Hbn., with *lupatus* Grt., as a synonym.

Lygranthœcia tuberculum Hbn. = *dorsilutea* Wlk. There seems to be little doubt of the correctness of this reference; but I am not at all sure that there are not two closely allied species involved. Both names are based on eastern specimens and I have an example from Texas that belongs to the same series. Some Colorado examples, however, seem to suggest another species and more material is needed before we can be sure on this point.

Lygranthœcia constricta Hy. Edw. The position of this species I have discussed in this Journal, XIV, 24. It must, in future, be listed as an aberration of *marginata*.

Porosagrotis patula Wlk. = *septentrionalis* Moeschl. This is as I have made it out; but I made both names to = *fusca* Bdv., and that proves to be an error. The suggestion that his species was identical with *fusca* was Moeschler's originally, in 1870, and I saw no reason to doubt it. The reference of *patula* to *septentrionalis* was made by me. Hampson now makes *fusca* Bdv., the same as *Euxoa cinerea* Schiff., a species which is not autoptically known to me.

Euxoa incubita Sm., is = *septentrionalis* Wlk., as stated by Hampson. As I pointed out in 1904 the species allied to *messoria* had not been distinguished in 1893, and when I differentiated them in 1900 I did not have duplicates of the form actually described by Walker.

Euxoa insulsa Wlk.: this species I identified with the *campestris-decolor* series in 1893, and cited a long series of synonyms. Hampson referred the species to *messoria* in his catalogue and I took the liberty of doubting the reference. Reëxamination of the type proves that my original reference was correct and that *insulsa* has nothing to do with *messoria*. The specimen is obscurely marked and to one not familiar with the wide range of variation found in this particular species the error was a natural one. There is perhaps no more widespread, common and variable form than this and of the series of 35 which I have in my cabinet, no two are quite alike. In a series of probably 100 duplicates I have every type from almost immaculate to brilliantly contrasting well written examples. The black filling in the cell in this species is a variable quantity and less constant than in any other species of the series.

Euxoa expulsa Wlk., I made out to be the same as *insulsa*, and in that Hampson agreed with me, referring both to *messoria*. I have seen no reason to change my opinion on their identity and of course this species follows *insulsa* in its removal from the list of *messoria* synonyms. All the other names which appear under *messoria* in the British Museum catalogue are already properly referred in my own work.

Euxoa choris Harv. = *cogitans* Sm. There are two allied yet distinct species in my collection, one of which I have under the name *choris* the other as my *cogitans*. In the British Museum only one of these species is represented. My identification of *choris* was from a colored drawing of the type made many years ago for Dr. C. V. Riley. It will be necessary, before the relation of these two names can be settled, to send over examples of both of the species that I have, for direct comparison with the Harvey type. At present my material is not sufficient to permit me to do this; but I hope to do so in the near future.

Agrotis insignata Wlk. Walker described two species under that name on two different pages of the same volume. The first of these I referred as a synonym of *insulsa* and the second, renamed *illata* by Walker in a subsequent volume, I referred to *ochrogaster*. Sir George Hampson refers the first name to *Euxoa*, with *pleuritica* Grt., as a synonym, and the second to *tessellata* Harr. There is no doubt that I mixed the two *insignata* in my original notes and that the first described form which I referred to *insulsa* is the one that should have been referred to *ochrogaster*. The type is a very faded uniformly colored example nearly like the *cinereomaculata* of Morrison and has nothing to do with *pleuritica*. It is a form of *ochrogaster* without reasonable doubt. On the other hand that *insignata* which I referred to *insulsa* is correctly placed by Hampson with *tessellata* and to that extent my catalogue must be corrected. The synonymy will stand, then, *Agrotis insignata* Wlk. = *Euxoa ochrogaster* Gn.: *Agrotis illata* Wlk. = *insignata* Wlk., = *E. tessellata* Harr.

Euxoa tristicula Morr. = *silens* Grt. This reference appears in my latest check list, but the synonymy was developed in the course of a correspondence between Sir George Hampson and the Brooklyn Institute, and both parties notified me of the conclusion reached. I have since verified it, by an examination of Mr. Morrison's type which is less distinctly marked than usual and does not at first suggest Mr. Grote's species. No one who compared Hampson's Fig. 20, Pl. LXVI of *silens*, with Fig. 13, Pl. LXIX of *tristicula* would ever dream that they could possibly be meant for one species. The latter figure is quite characteristic; the former is not in the least so.

Euxoa decolor, Morr., with *campestris* Grt., as a synonym stands as a good species in Hampson's work. Both names refer to one species surely enough, but it is the same species that Walker previously named *insulsa* as I have already shown, and therefore these names must be replaced where I had them in my catalogue.

Mamestra declarata Wlk., was referred by me to *insulsa*, and by Hampson to *tessellata*. A reëxamination of the type confirms my original conclusion and the reference to *insulsa* stands. *Tessellata* and *insulsa* are both variable species and run to local forms. It is quite possible to mix up a box of the two species and make them appear as extreme variations of one thing: yet when one has handled hundreds of examples from many localities, the two species in all their varieties show a characteristic appearence that enables their recognition at a glance. It is simply impossible for any student who has not become familiar with this specific individuality from long experience to place every example as it comes to him. And even in my own case, though I have handled the species now for nearly thirty years, I sometimes send back single examples without names, requesting additional material before final determination.

Agrotis perlentans Wlk. This is referred to *tessellata* and apparently with justice. It is one of those species that Mr. Butler could not find for me in 1891. As for the rest of the names, they stand in Hampson's work as they do in my own.

Euxoa verticalis Grt. This was first referred by me as a variety of *insulsa*, and is correctly restored to specific rank by Hampson. The range of variation while it approaches, does not include this form.

Agrotis spectanda Smith. Hampson refers this as a synonym of *verticalis*; but incorrectly so. There is no specimen of *spectanda* in the British Museum and the author never actually saw my species, the reference being made on the *dixit* of a collector who has seen both species in the Neumoegen collection.

I have reëxamined the species of *Chorizagrotis* and am confirmed in my separation of the species. Hampson makes *introferens* Grt., and *soror* Smith, as synonyms of *auxiliaris* Grt. *Soror* Smith is not in the British Museum collection at all, and is not a common species in my experience. In *auxiliaris* the female is quite different from the male and very like the male *introferens* ; so unless the sexes are first carefully separated out and associated, it is quite easy to range the two species into a continuous series. As between the males I have never been for a moment in doubt as to which was *auxiliaris* and which was *introferens*. The female of the latter species, by the bye, is more like the male *agrestis* than it is like its own mate.

Rhizagrotis cloanthoides Grt., appears in Hampson's work as a synonym of *albalis* Grt., in the bibliography ; but is referred to in the description as, "Ab. 1. *cloanthoides :* whiter." In my original work I placed them in this same way, before seeing the type of *albalis* in the British Museum. After that I referred the two as good varieties at least in my catalogue and, yet later, in my check list placed them as good species. The latter conclusion I still adhere to. The type of *cloanthoides* is in the old Graef collection and I have specimens compared with it. I have also a series of *albalis* which agree with Hampson's figure and description and with Mr. Grote's determination of his species in the U. S. N. M. The two differ not only in maculation but in the armature of the anterior legs, *albalis* having a series of long, curved, claw-like spines on the outer side of the tarsal joints which are absent or much reduced in *cloanthoides*. There is also a difference in the armature of the mid-tibia ; but my material in *cloanthoides* is too defective to make it possible to determine details now.

Taken as a whole the number of points in which the synonymy in the genus *Euxoa* has been changed from my original determinations is remarkably small. Some of the changes suggested by Hampson are correct and these are all noted here. Others of them are not well founded, and so far as our differences related to Walker's species, I believe Sir George has agreed that he was in error. As to those differences where lack of material in the British Museum prevented direct or sufficient comparisons, they can be easily settled later, when material becomes more abundant, and they affect no names on the "unknown" list.

Feltia evanidalis Grt., is the only species (except *olivia*) of the genus not represented in my collection and I have been trying to identify it with west coast examples of *subgothica* with contrasting yellow reniform. Hampson, however, places it next to my *pectinicornis* and that is correct. It really looks like a faded, yellowish, washed-out example of that species. It is passing strange that none of the Californian collectors have again taken this species.

The most aggravating change made in the synonymy by Hampson relates to *Feltia subgothica*, *tricosa* and *herilis*, and the pity of it is that he is correct and must be followed. In the Canadian Entomologist, XXVII, 301, 1895, Slingerland apparently proved to demonstration from published data that Haworth's name *subgothica* could apply to no other form than that afterward named *ducens* by Walker. To be sure Tutt in the same journal, XXVIII, 17, 1896, tried to prove that Haworth really figured only a variety of a common European species; but his argument was not convincing and I believed that Slingerland was right and followed him. Everybody assumed that Haworth's type no longer existed and therein we were in error, for it is now in the British Museum with a clear record as to its identity and it bears out Hampson's references to the full. What we have been calling *subgothica* Haw., must now be called *ducens*, Wlk., and were this all the change would be easy; but we must now use the name *subgothica* Haw., to replace *jaculifera* Gn., which will cause trouble in collections and to collectors. Fortunately *herilis* Grt., remains, and the possibility of change is now exhausted unless some one attempts to argue that, Guenée having included what Grote afterward named *herilis*, as a form of his *jaculifera*, that name must stand for the distinct form even if one part of it is really a synonym of a previously described name.

Agrotis docilis Grt. Hampson refers to this my *ingeniculata*, and I had been previously advised to the same effect and had accepted the reference, as appears in my check list of 1903, prepared before Hampson's volume was published. In my catalogue of 1893 I referred *docilis* to *occulta*, and now, after a reëxamination of the type, I am not at all ashamed of the reference. The type of *docilis* is really like a gray *occulta*. With a greater knowledge of the latter species I am convinced that *docilis* does not come within its range of variation and to that extent I was wrong. But the type of *docilis* is not my *ingeniculata !* There is another species involved here, which will be referred to under *Lycophotia astricta* Morr.

I noted in my previous paper that *Agrotis hospitalis* Grt., was cited as a synonym to *Agrotis brunnea* Schiff. ; but no American localities are given in the "Habitat." There are no American specimens in the British Museum collection and Hampson informs me that his reference was not based upon direct comparisons. I have now seen a number of examples of this species from well separated localities taken by different collectors; so that there is no doubt that we have a native, though very rare species to deal with. There is no doubt either that the resemblance to the European *brunnea* is well-marked and very close; but I am by no means certain that we are justified in referring the name to the synonymy until more careful and thorough comparisons, extending to an examination of the ♂ genitalia shall have been made.

Agrotis eriensis Grt. Hampson is correct in referring this to *jucunda* instead of *phyllophora* where I placed it. The specimen is unusually large, lacks all black and has yellow costal mottlings.

Agrotis esurialis Grt. This is a good species as Hampson makes it, rather than a race of *jucunda* as I believed in 1891. The species in this group of what I call *Noctua* are much more numerous and more closely allied than I believed fifteen years ago, and this Pacific Coast form is entitled to stand. I have nothing in my collection that is quite like the type; but the species has a Pachnobia-like appearance that is characteristic of a series that I have from Oregon and I believe these to come within the range of variation.

Noctua patefacta Smith. This is without much doubt *Agrotis juncta* Grt., although Hampson has kept them as distinct. I have had a figure of *juncta* for some time, marked as a faded *patefacta* in my collection, and direct comparison confirms my belief. My name must be cited in the synonymy in future.

Agrotis subporphyrea Wlk. Hampson places this species with *biscipellis*, *atrifrons* and *cinereicollis*, rather than with the species of *Rhynchagrotis* where I was inclined to seek its allies. There are two female examples in the collection and I cannot remember even having seen anything to match them among American material. The figure on Pl. LXXI of the "Catalogue" is good as to form and color; but he lines are much more prominent than in the original.

The species that we have heretofore known as *Pachnobia carnea* Thunb., must hereafter be cited as *P. cinerea* Stgr. At the time of ny previous visit to the Museum there was a mixture of species under he name *carnea*, and I noted in my catalogue that I did not autoptically know Thunberg's species. I followed in the identification Mr. Grote, and he, I believe, relied upon Staudinger, Speyer, Moeschler and Zeller. Hampson now places *carnea* Thunb., as a synonym of *brunnea* Schiff., and raises what Staudinger named as an aberration to specific rank. As it stands now the American form is not circumpolar and is different from anything found in the European fauna.

Noctua rava H.-Sch., stands in our catalogues and lists with *umbrata* Pack., as a synonym. Hampson puts both names under *Episilia quadrangula* Zett. In the British Museum collection there are five examples: one from Labrador, four from Iceland, and the first specimen appears to me to be specifically distinct from the other four. I have four examples from Labrador, compared with, and very similar to Dr. Packard's type, so that I am sure of that species. The determination that *umbratus* was identical with *rava* was made by me in 1890, partly from Herrich-Schaeffer's figure, partly from specimens sent me as *rava* by Moeschler. I am not in position to verify my original determination at present, and am not familiar with the true *quadrangula* of Zetterstedt; but I feel very sure that there are two species included in the three names *quadrangula*, *rava*, and *umbratus*, and I am quite ready to believe that the original error was mine, in making *umbratus* Pack. the same as *rava* H. S. Until some one is in position to settle the question from knowledge of all three species, I prefer to leave matters as I have them now.

Lycophotia radiola Hampsn., replaces *Setagrotis radiatus* Sm., because two years previous to my description Schaus had described *Praina radiata*. According to the basis adopted by Hampson, Mr. Schaus's species and my own are generically the same, and the new name was a necessity. But I do not believe that the genera are identical. I will admit that my *Setagrotis* is the same as *Lycophotia* Hbn., if anything is to be gained by that; but *Praina* Schaus is certainly not, from my point of view, the same as *Setagrotis;* therefore, for the present I will continue to use the name as I wrote it, admitting, if you please, that I would not have used the name had I known of its earlier occurrence in an allied genus.

Lycophotia præfixa Morr., was described from the Julius Meyer collection and I have a photograph of the type. After examining the type of *Agrotis gracilis* Grt., and concluding it distinct from my *ingeniculata*, it occurred to me to compare it with the Morrison name and its description and I believe that the two refer to the one species. To me the resemblance of *docilis* to *occulta* seemed obvious from the first, and a reëxamination, while it showed that the two were not identical, as I had at first believed, yet confirmed my opinion as to their close relationship. The habitat of *docilis* and *præfixa* is the same, and while I am not ready to make the reference definitely, I believe that eventually it will be found that one species only is referred to.

Peridroma infecta Ochs., will probably have to replace *incivis* Gn., [ampson writes. The British Museum series is a long one, cov- g a good range of both North and South American localities, and e the extremes look as distinct to me as ever, the intermediate e appears to fill in the gap completely.

Noctua lubricans Gn. To this specimen Hampson cites *illapsa* *associans* Wlk., and *beata* Grote. *Associans* is a pure synonym *ubricans; associans* is ranked as a Canadian and eastern form, and *a* as a western form. This is right, in a way: *lubricans* and *asso- s* refer to the same form and so does *spreta* Smith I am afraid, ough my specimens are much grayer and more uniform than the s of the older species. The species that is most commonly marked *icans* in our collections is not this Floridian form at all; but is the to which the name *illapsa* more specifically applies. It ranges round color from gray to reddish and varies greatly in other direc- s; but there is no specific connection with the type which I sepa- l as *spreta* and to which, apparently, the name *lubricans* really ngs. *Beata* Grt., is also a good species I believe.

Anomogyna lætabilis Zett., is recorded from Labrador by Hamp- on what authority I do not know. The species is not represented e British Museum by American examples, and I have not seen it to recognize it in any of our own collections. Nevertheless the g is not impossible, and perhaps the name had better be added to lists.

Abagrotis ornata Sm., is placed with *A. erratica* in the collection apparently with justice. Dr. Dyar collected this species in large bers at Kaslo, and it appears that while my *erratica* happened to he almost immaculate form, the specimens I made types of *ornata* sharply and clearly marked, with all the normal maculation well ten.

The first volume of the series ends with *Protagrotis viralis*, a ies which I referred as identical with *Luperina passer* from my ious examination. In the determination that there is a single : between the two pairs of spurs on the hind tibia, Hampson is ubtedly correct, and it is equally certain that in my long series *sser* I have no example that shows this peculiarity. Hence *viralis* ite of its similarity to a form of *passer*, must be restored to rank good species.

Volume V of the Catalogue, the second of the Noctuid series, was published in 1905, and is devoted to the "Hadeninæ" or hairy-eyed genera. I have already called attention to the fact that this term will not at once convey its intended meaning to American students who have been in the habit of associating the term *Hadena* with forms having naked or "lashed" eyes.

The first genus with American species is *Barathra* Hbn., with *brassicæ* of Europe as the type and our two American species as associates. Hampson, however, makes *occidenta* Grt., a synonym of *configurata* Wlk., and in this he is correct. I have already noted the fact that the *Mamestra configurata* Druce, Biol. Cent. Am., Het. 1, pl. 26, f. 20, was probably the same as Mr. Grote's species; but I was not previously certain that it was really the same as Walker's species. The name must now stand as *B. configurata* Wlk., with *occidenta* Grote as synonym.

Mamestra chartaria Grote and *M. florida* Sm., are separated and associated with two Asiatic species under the generic term *Discestra* Hampn., based upon a frontal modification which I had overlooked in our species. *Chartaria* is the type of the genus which is a good one.

Mamestra yakima, disguised as *yacima* is the only one of our species referred to *Craterestra* Hampson. The genus is described as having "frons with truncate, conical, corneous prominence with corneous plate below it"; etc. This frontal structure I am unable to demonstrate in any of my examples. The front is somewhat roughened, but there is no prominence and no plate. The genus seems to be a good one, but I doubt whether our species is correctly placed in it.

Scotogramma Smith is considerably extended, enlarged in scope, and altogether changed from its significance. *Trichopolia ptilodonta* Grt., is referred to it, with doubtful justice — at all events it would not have occurred to me to place it there. So of *Mamestra trifolii* which I could not separate from the typical genus in my revision of it. *Mamestra hadeniformis* which I placed next to *grandis,* is referred to *Scotogramma* with a query, the species being known only from a figure. I am not quite ready to accept the correctness of the reference without a reëxamination of the type which is not now in my possession.

Mamestra impolita Morr., is also made a *Scotogramma,* and tha is probably correct. *Mamestra defessa, repentina* and *orida* are a new additions, while of my original species, only *submarina* remains. *Scotogramma* as I intended and understood it in 1889 is altogether lost and a totally different conception of the genus is presented. In fact as it stands now the genus is not mine at all.

Anarta Ochs., so far as it refers to our species also presents a changed appearance. *A. staudingeri*, var. *mœschleri* Staud., is an addition from Labrador, and is unfamiliar to me. *Anarta lanuginosa* Sm., from Alaska is referred as a synonym to *A. richardsoni* Curt.

Anarta schœnherri Zett., drops out of the genus, and so does *quieta* Hbn. According to Hampson the two are one, belong to the genus *Agrotiphila* and there are no American records. *Anarta leucocycla* Staud., which its describer referred as a synonym of *schœnherri* is recognized as a good species and Greenland is the only locality cited. It is a question, therefore, whether any of these names are properly in our catalogues.

Anarta acadiensis Beth., is definitely referred to *A. myrtilli* Linn., as a synonym, and that seems probably right. *Anarta phæa* Hampsn., is a new species from Arctic America, and is a very dull, obscurely marked form near *impingens*, which remains as it is in our catalogues.

Anarta secedens Wlk., is removed to *Polia*, while *A. melaleuca*, *lapponica*, *kelloggi*, *zetterstedtii* and *funebris* are not hairy eyed species at all and reappear in the next volume under *Sympistis*.

The genus *Lasiestra* Hampson is really *Scotogramma* as I meant it to be. It contains just those species that I considered typical of my genus, and is, in effect, the assemblage that I held together under that name in my revision of some Tæniocampid genera in 1889. My designation of *submarina* as type of the genus of course fixes it; but I am not ready to consider all those species classed with it by Hampson as really congeneric.

Scotogramma luteola Smith, is made a synonym of *S. phoca* Moesch., and *promulsa* Morr., which I made a synonym of *phoca* in 1889 is restored as a good species, my *infuscata* being cited as a synonym. In so far as *promulsa* is held as a good species, distinct from *phoca*, I agree: on all other points I dissent most strongly. Hampson's figure of *promulsa* Pl. LXXIX, represents my *infuscata* fairly well; but it does not represent Morrison's *promulsa*. I know that species well from actual examination of the type and it is simply impossible to confuse the two. Both species are before me for direct comparison. As to the identity of *luteola* with *phoca* I cannot speak with equal positiveness because I have no Labrador examples of *phoca* at hand now and cannot compare the photograph that I had of the type; but I am by no means agreed that the two are even probably the same.

Lasionycta Hampson, differs from *Lasiestra* in having the thorax clothed with hair and hair-like scales, while in the latter genus the clothing is entirely hairy. This difference I considered as authorizing only groups in my genus *Scotogramma*, and several of my species of that genus find a place here: *inconcinna*, *conjugata*, *subfuscula* and *sedilis*. These are all congeneric; but with them are associated *Mamestra rainierii* and *arietis* and *Xylomiges ochracea*. The first may belong here; I have no specimens for comparison, and had only a ♀ for description: the last I would not have thought of putting here, though it fits better, perhaps, than in *Xylomiges*. The change in the synonymy of what we have known aa *insolens*, is unexpected. Mr. Grote himself said that his *arietis* was the ♂ of his *insolens*, and that was never before doubted. That Mr. Morrison's species *earina* was the same as *insolens* was pretty general knowledge before I made the reference. Hampson now claims that Grote really had two good species before him and places *arietis* in *Lasionycta* while *insolens* goes into *Polia*. He was good enough to send me a ♂ specimen of *arietis*, and there is no doubt but that it is different from the single ♂ that I had under *insolens*. Unfortunately, material in this species has always been very scarce with me, hence I can say nothing of the generic separation. The two species certainly look very similar.

And now comes a list of over 200 species referred to *Polia* under which 16 generic names are cited as synonyms. The genus includes a large proportion of the species which stand as *Mamestra* in our lists and, in general, the synonymy is as in these lists. *Mamestra crydina* Dyar, is cited as a synonym to *M. purpurissata* Grt., but that is an error. Dr. Dyar described his form as a variety only, and as Hampson recognizes no varieties, the citation was justified under his rules. But *crydina* is really a very good species, abundantly distinct from *purpurissata* in structural and ornamental characters. I had an odd specimen separated out for a long time before Dyar described, and the recent receipt of additional, good examples, fully justifies the separation. It may be added that I saw no examples of *crydina* in the British Museum collection, so that Sir George had no opportunity to judge of the standing of the name.

Mamestra fusculenta Smith is placed as a synonym of *crotchi* Grt.

in the bibliography, but is marked as "Ab. 1. *fusculenta*: darker." The term aberration seems here and in general to be used as meaning a well-marked form or race, and I am inclined to believe that a race is what we have to deal with here.

Celæna perta Druce, is cited to *Mamestra lepidula* Sm., and correctly. The type of *perta* is a small very intensely marked example and at first sight appears distinct.

Polia canities Hampsn., is a new species based on one ♂ from "California." It is a small, inconspicuous form, creamy gray in color without contrasts, and resembles *arietis* Grt., in habitus.

Scotogramma discolor Sm., is referred here, and I am not sure that this is correct. There is a single ♂ from Colorado in the collection and I am decidedly doubtful of the correctness of the specific identification. I could not verify it and have no material of my own to send in for comparsion, so this form will have to remain a little doubtful for the present.

Tæniocampa columbia Sm., is placed between *Polia determinata* and *meditata*, and that is correct. My original material was imperfect and induced the erroneous generic reference.

Polia rubrifusa Hampson, is a new species from New Mexico, Beulah 1 ♂. I have a ♀ from the same locality that I had placed with *determinata*, as an unusually well marked specimen. Its specific separation is, however, warranted I think.

Scotogramma umbrosa Sm., follows immediately, and again I dissent. The species is a close ally of *sedilis* as I have it in my collection, and should be associated with that species. There are no specimens in the British Museum.

Mamestra negussa Sm., is cited to *M. plicata* Sm., to which I do not agree. I have reëxamined the two forms, both of which are represented in my collection, and while the two are undoubtedly close allies, yet the Colorado form is so much larger and differently marked that I do not believe them the same.

Polia insolens Grt., with *earina* Morr., as a synonym comes in here and this species has been already referred to.

Mamestra canadensis Sm., is cited as a synonym of *Polia nevadæ* Grt., but I think incorrectly so. Mr. Grote's species is a much brighter, more contrasting, broader-winged form than my own, while the type of maculation is undoubtedly very similar. It is not impossible that the two may be races only, and unfortunately my supply of what I consider the true *nevadæ* is extremely limited. The form that I have as *canadensis* is less rare.

Polia glaucopis Hampson, is a new species from Vancouver and resembles an intensified, brilliant *lubens*. I have no material from that locality in that species; but I do not doubt the distinctness of the new form.

And now we come again to *Mamestra cristifera* Wlk., and *M. lubens* Grt. On the occasion of my first visit to the British Museum I compared the types of the two forms and concluded that Mr. Butler had been correct in placing them together. Mr. Grote never admitted the correctness of this reference, and on my second visit, in 1900 I made another comparison in the light of greater experience. At that time I noted that "Walker's type from Hudson's Bay has none of the bright coloring of *lubens;* is dull ashen, verging to blackish in the dark spaces: is a smaller species and nearer to *invalida* Sm." Hampson refers *lubens* to *cristifera*, but makes it "Ab. 1." and points out the differences noted by me, except that he differentiates *lubens* from *cristifera* instead of the reverse, as I had it. On this third visit I again compared the types and other material and am convinced now of the distinctness of the two forms. I have no *cristifera* in my collection, but I do have a very fair series of *lubens* none of which approach the Walker type.

Mamestra larissa Sm., is cited as a synonym of *anguina* Grt. There is only one example of *anguina*, and that does not seem out of place in the series of ten *larissa*. I have reëxamined my series of both species and feel very sure that with more *anguina* at hand Sir George will be ready to admit the distinctness of my species.

The series of specimens under the names *vicina* and *pensilis*, indicates that a revision of these forms is needed, with long suites from various localities for comparison.

Scotogramma densa Sm., with *megæra* Sm., as a synonym comes into this series. I must confess I cannot see why this association is as good as with *submarina* to which *densa* is much more closely allied than it is to *megæra*. Dr. Dyar in his catalogue makes the latter a variety of *densa;* but the two are different in size, in wing form, in ground color, and in the color of the secondaries in both sexes. My material in these species is sufficiently good to demonstrate their distinctness.

Tæniocampa palilis Harv., is brought into this association and with justice. It is much better placed here than where I had left it in the Tæniocampid series.

Polia stenotis Hampson is a new species from California out of the Walsingham material. Sir George was good enough to send me an example out of the type series and soon afterward I received a small series of examples from Stockton, Utah, dated October 2 and 3. The species is a very distinct one.

Polia stricta Wlk., receives in addition to *cinnabarina* Grt., and *ferrea* Grt., my species *circumcincta* as a synonym. Dr. Dyar had just previously placed the same name into the synonymy of *olivacea* and as both these authorities agree that *stricta* and *olivacea* are distinct, one of them must be wrong in referring *circumcincta.* Under the circumstances I prefer to hold my species as distinct, first because I believe it to be so, and second because I do not believe either of the two gentlemen have the true *circumcincta.* The type is in my own collection; the species is certainly not in the British Museum and as I described from a single pair out of the Edwards collection, retaining the male and returning the female, the other type should be in the American Museum of Natural History. I would further suggest that I figured the male genitalia of all the forms and while these might authorize Hampson's reference, they never could by any possibility authorize Dyar's.

Under *Polia olivacea* Morr., all the forms described by me in 1901 appear as synonyms, and in addition *M. comis* Grt., and *Celæna hamara* Druce. As to the latter I have no opinion, since I did not compare the type. As to the others I am quite willing to let them take their chance of a future existence; some of them are races almost surely; others, including *comis,* are very good species.

Polia secedens Wlk., is the species that we have so long had as *Anarta secedens* and which was originally described as a *Plusia.* The yellow secondaries and general habitus go far toward justifying the original reference and the species is another of those Hudson's Bay forms that are so generally lacking in our American collections.

The genus *Hadena* Schrank, as used by Hampson, contains only one American species, *procinctus* Grt., which stands in our lists as *Dargida* Wlk. The Mexican *graminivora* is very similar in appearance, as noted in my catalogue, but abundantly distinct.

Tholera Hbn., replaces *Neuronia* Hbn., and my *americana* remains our sole representative.

Epia Hbn., is used for a small series of species in which there is a frontal modification and an armature on the outer side of basal joints of anterior tarsi. Our species are *capsularis* Grt., *minorata* Sm., *ectrapela* Sm., and *circumvadis* Sm.

Cardepia Hampson is separated from *Trichoclea* Grt., by a small modification of the frontal structure and our *Trichoclea nova* is one of the two species referred to it. I should hardly have considered the differences found on comparing the descriptions as of generic value.

Trichoclea Grt., receives quite a number of new species including *Mamestra u-scripta* Sm., *artesta* Sm., and *fusculenta* Sm. The addition of the former destroys the similarity of appearance and habitus which has been rather a characteristic of this genus heretofore; but so far as I have verified them the references are all warranted by the structure.

Chabuata Wlk., with *ampla* Wlk., as type replaces *Tricholita* Grt., with *signata* Wlk., as type. I do not consider the union of these genera justified at all. *Tricholita* Grt., has antennæ pectinated in both sexes, *Chabuta* (*ampla*) has them simple in both sexes the joints in the male being ciliated only. It is of course a question as to what are generic characters and in this case I will certainly continue to use *Tricholita* for the species heretofore so listed in our fauna.

Leucania velutina Sm., is the solitary representative of *Chabuata* typical series; but I am not familiar enough with the surrounding species to attempt to rescue it from its strange environment. Where I placed it, in *Leucania*, it was quite as much at odds with its companions.

Hyssia Gn., receives *Ulolonche* Sm., as a synonym; but my conception of *Ulolonche* is utterly unlike Hampson's conception of *Hyssia* Gn., for there are some species of *Mamestra*, like *senatoria* and *gussata* placed here which I would never think of associating with my *Ulolonche*. I must confess that a classification which separates into different genera such closely allied forms as *Mamestra gussata* and *negussa* does not appeal to me with convincing force.

Placed in parallel columns we have the generic differences

Polia.	*Hyssia.*
Proboscis fully developed;	Proboscis fully developed;
palpi obliquely upturned, the second joint fringed with long hair in front, the third short;	palpi upturned, the second joint fringed with hair in front, the third short with a small tuft of hair in front;

frons smooth ;	frons smooth ;
eyes large, rounded ;	eyes large, rounded ;
head and thorax clothed chiefly with scales, the pro- and metathorax with crests ;	head and thorax roughly clothed with scales mixed with some hair, the pro- and metathorax with spreading crests ;
pectus and tibiæ clothed with long hair ;	tibiæ fringed with long hair ;
abdomen with dorsal series of crests.	abdomen with dorsal crest on first segment, some rough hair at base and lateral tufts of hair.
Fore wing with veins 3 and 5 from near angle of cell ;	Fore wing with veins 3 and 5 from near angle of cell ;
6 from upper angle ;	6 from upper angle ;
9 from 10 anastomosing with 8 to form the areole ;	9 from 10 anastomosing with 8 to form the areole ;
11 from cell.	11 from cell.
Hind wing with veins 3, 4 from angle of cell ;	Hind wing with veins 3, 4 from angle of cell ;
5 obsolescent from middle of discocellulars ;	5 obsolescent from just below middle of discocellulars ;
6, 7 from upper angle or shortly stalked ;	6, 7 from upper angle ;
8 anastomosing with the cell near base only.	8 anastomosing with the cell near base only.

Absolutely the only differences here given are the slight points in differences of vestiture and even these are more matters of words than of facts. The abdominal tuftings as between *gussata* and *negussa* are exactly identical at base and laterally ; but there is only one distinct dorsal crest in *gussata*. The thoracic tuftings and the vestiture are so nearly alike that I can see no differences. In *plicata* which is cited as a synonym of *negussa*, the second abdominal segment has a very small crest, the other segments have none.

Comparing the ♂ genitalia on mounted slides I find an identity of type in the three species, and only small differences of detail between them. Now identity of type, if the type is a simple or generalized one does not mean very much ; but where the type is specialized and characteristic, it means a great deal, and any classification that separates such very similar forms as *gussata* and *negussa* by several genera and nearly 300 species, is at least not ideal. Personally I prefer to keep them closely associated in one genus.

The genus *Eriopyga* Gn., is another large aggregation, containing over 200 species, and includes many of our *Tæniocampa*, *Orthodes*, *Pseudorthodes* and *Himella*.

Eriopyga melanopis Hampsn., is the species that I had identified as *perforata* Grt., erroneously as it proves from an examination of the type.

E. orobia Harv., which I had considered as a variety or form of *oviduca*, is here recognized as a good species, and that may be right. The species in this series are much more closely allied than I had believed, and *orobia* looks like an obscure *melanopis* without the contrasting stigma.

Eriopyga planalis and *agrotiformis* Grt., are closely allied and will prove sexes of one species, I think. *Planalis* is the male, *agrotiformis* the female.

Eriopyga consopita Gr., is separated from *culea* Gn., to which I had referred it as a synonym. It is the reddish form in which the median lines are almost lost, and with only two examples of each at hand and these the extremes, they seem distinct enough ; but I have an equally red form from Long Island, and have seen almost immaculate forms of the creamy type. I am still of the opinion that the two are specifically identical.

Orthodes nimia Gn., is referred to *Eriopyga cynica* Gn., instead of to *vecors* Gn., and that is correct.

Eriopyga (*Agrotis*) *conar* Strck., has *Himella quadristigmalis* Sm., as a synonym, and that is correct: I had previously made the reference in my check list. A specimen of *Himella infidelis* Dyar, sent in by the describer, is the same species. Both *contrahens* and *conar* vary similarly. My species was the well marked form with almost uniform ground color ; Dr. Dyar described the other extreme with mottled smoky wings and less contrasting maculation. Hampson, by the bye, makes this reference in his addenda.

Eriopyga affurata Hmpsn., is proposed for the species that I had considered identical with the eastern *furfurata*, and this error of mine had been previously recognized by Dyar who named the same form *communis* : a fact also noted by Hampson in the addenda.

Nephelodes Gn., contains only our species ; but for the common form the name *emmedonia* Cram., replaces *minians* Gn. This is probably correct. The synonymy is changed in that *Monosca subnotata* Wlk., is added and *sobria* Wlk., is removed. *Graphiphora sobria* Wlk., is really not a hairy-eyed form at all and is the same as *Mamestra inducta* Wlk., which Ihad referred to *Carneades messoria*. Hampson has referred the names to *Copitarsia turbata* H.-S., and in this I believe he is right. That species is Central and South American.

Trichopolia Grt., receives as an addition *Lathosea ursina* Sm.,—an addition which I think would not have been made had Hampson compared the other species, both of which were autoptically unknown to him.

Stretchia Hy. Edw., is confined to *muricina*, *plusiæformis*, *variabilis* and *inferior*, with the Japanese *saxea* added.

In *Morrisonia* Grt., there is quite a change in the synonymy. *Xylina multifaria* Wlk., appears under *mucens* as a synonym, instead of under *confusa*, where I placed it. It is a ♀ and comes from the same locality as *spoliata* Wlk., which is a ♂ and which I referred to *mucens*. A reëxamination leaves me in such doubt that I would probably have made the same determination again; but in view of the facts above stated, I accept Hampson's conclusions as probably correct.

M. sectilis Gn., is separated from *evicta-vomerina* with which I had associated it, and that is correct; but with it is placed *rileyana* Sm., which I do not believe right. *Sectilis* is larger, redder, and the econdaries are smoky, while in my species they are nearly white. The type has been reset and would hardly be called a poor specimen t the present time.

Morrisonia peracuta Morr., which has not been known from other han the types and has never had a definite locality, is now referred s a synonym of *Persectania evingi* Westw., from Australasia, and with apparent justice.

Xylomania Hampson is a new genus for a combination of species, ome of them heretofore referred to *Stretchia*, some to *Tæniocampa*, but most of them to *Xylomiges*.

Xylomania alternans Wlk., replaces *Xylomiges tabulata* Grt., and bout this I am doubtful. The Grote type is like what I have always had under his name: the Walker types are much brighter, redder exmples, much more xyliniform in appearance and I do not consider good species excluded. There is no definite locality to the Walker pecies.

Perigrapha Led., is enlarged in scope to include species with simple antennæ in the female, and includes a number of species which we have under *Stretchia*, and some that are under *Tæniocampa*. There is no change in the synonymy.

Monima Hbn., contains those of our *Tæniocampa* that have the general appearance and wing form of *alia*. *M. subterminata* Sm., is made a synonym of *revicta* Morr., and that is correct.

Perigonica remains as in our lists and has no foreign additions.

Sideridis Hbn., replaces *Crocigrapha* Grt., and *Mamestra rosea*, *congermana* and *rubefacta* are added to *normani*. Here again I must dissent from the association. *C. normani* differs so much from *rosea* in wing form and in certain structural peculiarities of the ♂ that except in a purely artificial arrangement they should not be closely associated.

Mamestra vindemialis Gn., is referred to *Physetica* Meyr., and Hampson comments as follows: "The type has the abdomen of a male of some other species stuck onto it, and will probably prove to be from New Zealand." It will be safe, I think, to drop the name from our lists hereafter.

Ceramica Gn., is restored as a good genus with *picta* Harr., as sole species, and that is perhaps a satisfactory disposition of the matter.

Cirphis Wlk., is used for *Leucania* as it stands in our lists. *C. eboriosa* Gn. (not *ebriosa*) and *C. obusta* Gn., which have figured as American insects for so long a time are now referred to Tasmania, and thus satisfactorily disposed of. To *L. multilinea* Wlk., *solita* Wlk., is added as a synonym, and apparently with justice. *L. heterodoxa* Sm., is made a synonym of *insueta* Gn., although they are quite unlike and the genitalic characters of the ♂ are obviously different. *L. megadia* Sm., is made to equal *dia* Grt., and that may prove to be correct.

Leucania subpunctata Harv., is referred as a synonym to *C. latiuscula* H. Sch., in company with half a dozen others and this seems to be correct. The species extends through Central and South America and into the West Indies. It is somewhat variable and has been described for the different faunas.

Mamestra 4-annulata Morr., finds a place in this genus and this seems scarcely justified. There is one poor example in the Museum which is correctly determined; a second example is much better; but seems to me to represent quite a different species. I believe the association with *Mamestra* much better than with *Leucania*.

Borolia Moore, is made to apply to our smaller, whiter species of

Leucania. *Borolia linita* Gn., with *scirpicola* and *amydalina* as synonyms, is separated from *extincta* Gn., which latter is made to equal *ligata* Grt., and this is correct. My original reference of *linita* to *extincta* was based on an insufficient knowledge of our species. *Leucania texana* Morr., is referred as a synonym, or rather a white aberration to *extincta*, and I am willing to accept this as correct. *L. rimosa* Grt., is cited to *B. flabilis* Grt., and looks correct. The material in this series is decidedly scanty and the relation of the forms to each other is uncertain. The B. M. *flabilis* is rubbed and not so good as the Tepper example. The species is taken at Anglesea, N. J., and I fully expect *rimosa*, *flabilis* and *ligata* to prove the same.

Meliana Curt., is used to apply to yet another series of *Leucania* and to include my species of *Neleucania*; but here again I do not agree with Hampson's association. I know the type of *Meliana*, *i. e.*, *flammea*, and consider it generically distinct from the species of *Leucania* here referred to it, and even more obviously different from the species that I call *Neleucania*.

M. albilinea Hbn., receives a long series of synonyms including species with white and with black secondaries. It is sufficient to say on that point that all the separations made by me in 1902 have been abundantly confirmed by additional material and that new points of difference have developed. The British Museum collection contains what would ordinarily be considered a good series, ranging in locality from Nova Scotia to Argentina; but there are only a few, sometimes one or two examples from each locality, and that is not enough to determine the validity of species in this series.

Leucania Ochs., is restricted to forms allied to *pallens*, which is made the type of the genus.

Under *Leucania pallens* we find *luteopallens* Sm., and *pertracta* Morr. The latter may be correct, if Mr. Morrison's species is, as I suspect, based on a European specimen. As to the distinctness of the American form I have already written at sufficient length, and need only repeat that an abundance of additional material has not suggested the necessity for any change of opinion on my part.

Here ends Volume V of the Catalogue which is the second relating to Noctuidæ. It is an enormous piece of work as a whole. I have recorded a good many disagreements; but these are based largely upon a different conception of the value of characters for generic divisions. Sir George Hampson has placed lepidopterists under an obligation whose extent is not easy to estimate save for him who has to deal with the species, and he has made it possible to recognize the species treated. I do not expect to follow the work in its generic divisions or in accepting his generic types; but that does not lessen the value of the work to any one, while to one who thinks as Hampson does in the matter of generic types and characters, the work is simply indispensable.

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Class I, HEXAPODA.

Order VI, TRICHOPTERA.

Order XIV, CORRODENTIA.

NEW TRICHOPTERA AND PSOCIDÆ.

BY NATHAN BANKS,
FALLS CHURCH, VA.

The following descriptions of six caddice-flies and six Psocidæ are the last that I shall publish before the appearance of my catalogue of our Neuropteroid insects.

Order TRICHOPTERA.

Holocentropus flavicornis, new species.

Vertex with a large patch of long white hair, and a tuft of dark rich brown hair each side; antennæ and palpi pale yellow; thorax white-haired in the middle and a brown stripe each side; abdomen brown, tips of segments above, pale; appendages yellowish; legs pale yellow, the hind tibiæ with many long hairs, the anterior tarsi somewhat dusky on the outer side. Wings brown, densely mottled with whitish or pale yellowish, the costal area before end of subcosta with three large dark spots, apical fringe alternately brown and pale; venation brown, with four whitish hyaline cross-veins; the arculus, that connecting cubitus to median, that between forks of median, and that from median to radial sector. Hind wings gray, with brown venation, and gray fringe. Expanse 12 mm.

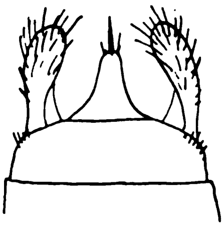

FIG. 1.

Several from Washington, D. C., High Island and Plummer's Island, Md.; June 23 to September. Fork 1 is present in the hind wings, as in *Plectrocnemia*; but its small size and general appearance is more like *Holocentropus*.

Neureclipsis parvula, new species.

Head brown in middle, posterior warts yellow, as also those of prothorax and lateral lobes of mesothorax; all warts bearing dense tufts of long yellow hair; antennæ and palpi yellow; abdomen brown, the ventral segments margined with pale; anal appendages yellow; legs clear, pale yellow. Wings yellowish, with yellow hair, venation pale, four whitish hyaline cross-veins: the arculus, one connecting cubitus to median, that between the forks of the median, and one from median to radial sector; hind wings yellowish, dusky toward tip. Expanse 11 mm.

Several specimens from Washington, D. C., High Island and Plummer's Island, Md.; June 17 to August 29.

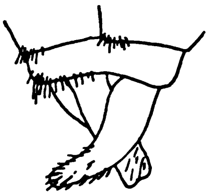

FIG. 2.

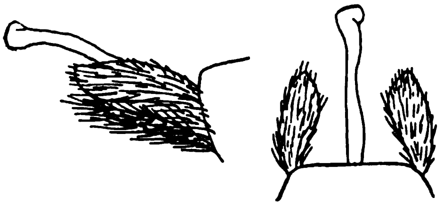

FIG. 3.

Orthotrichia nigritta, new species.

Black, densely clothed wlth deep black hair, which in some lights shows purplish reflections; some brown hair on mesothorax, and on wings just before the upturned tips, and the fringe, both costal and apical, brown; antennæ brown; legs brown, the tarsal joints paler on tips. Male genitalia shows a broad leaf-like plate each side, and a narrow, very hairy piece each side below it. Expanse 5.5 mm.

Three specimens from Austin, Texas, March 1.

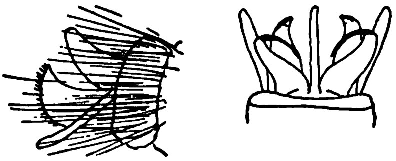

FIG. 4.

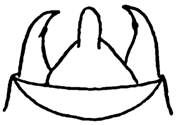

FIG. 5.

Hydroptila transversa, new species.

Head with gray hair on face, black between antennæ, and white on vertex, antennæ yellowish white, with a dusky band near middle, and the tip broadly dark; white hair on thorax, with some brown at base of wings; abdomen mostly clothed with white hair; legs pale yellowish, with yellowish hair, tibia and part of tarsus one darker, other tarsi also darker, and a long gray fringe from hind tibia of male. Wings mostly black-haired, not densely so; a very narrow, and not always distinctly complete transverse white line across wing near middle, beyond is one pale spot in middle, one on costa, and one near tip, the extreme tip jet black; fringe dark gray to blackish, whitish at two spots on front margin, and two spots behind; hind wings pale, with gray tip, and a gray fringe, extremely long behind. Expanse 5.5 to 5.8 mm.

Several from Washington, D. C., September, at light.

Agraylea fraterna, new species.

Head black, with some black hairs around base of antennæ and below, above with whitish hair; antennæ blackish with white hair. Thorax black, with whitish hair; abdomen black, with a broad pale lateral stripe; venter pale near tip; legs pale yellowish, the femora with blackish on each side along the middle. Wings black to beyond the middle, then mostly whitish, except around tip, where there are six deep black marginal spots, separated by smaller white spots; in the black basal part there is an elongate whitish spot on the anal margin, and several small spots elsewhere; the white part beyond middle is indistinctly divided by a dark stripe; fringe mostly dark gray, white at white spots; hind wings pale, with long pale gray fringe behind. The ventral lobe of male is slender and reaches nearly to tip, much like *A. cognatella.* Expanse 8 mm.

Several specimens from Falls Church, Va., May 1.

Allotrichia flavida, new species.

Head blackish, with yellowish hair; antennæ yellowish, and with yellow hair, thorax brown, with yellowish hair, two especially conspicuous tufts from the pronotal warts; abdomen yellowish brown, dark at tip, clothed with whitish hair; legs pale yellowish, with almost white hair. Wings yellowish, some brown and black hair on basal third, and scattered elsewhere in patches, especially noticeable are six brown spots at the apex of the veins, and a streak at the end of anal vein, otherwise the hair is pale yellowish; apical fringe grayish, with some darker at anal angle; hind wings pale, with long fringe almost snow-white. Expanse 10 mm.

Three females from Ft. Collins, Colorado, June 9.

Order CORRODENTIA.

Myopsocus coloradensis, new species.

Head black, an elongate pale spot on each side of the nasus, and sometimes a spot each side on vertex. Antennæ pale, tips of joints black; thorax black, with a large pale spot on each lateral lobe; abdomen black; coxæ black, femora black except pale tip, tibia pale except black tip, first tarsal joint pale except black tip, and rest of tarsus black. Wings mostly black, paler on base and beyond middle, leaving a broad, oblique black band across middle of wing, several white spots on margin, and along veins are many white dots; the whole similar to *M. sparsus*, but blacker. It differs at once from *M. sparsus* by the shorter antennæ, the third joint (first long joint) being plainly shorter than the width of the head from eye to eye, while in *M. sparsus* the third joint is fully as long as width of head. Venation similar to *M. sparsus*, but the pterostigma is scarcely as wide, and the discal cell is usually faintly pedicellate. Length 4.5 to 5 mm.

Several specimens from Ft. Collins and Boulder, Colo. The latter taken by Professor Cockerell under stones on Flagstaff Hill.

Psocus oppositus, new species.

Head pale, a black mark across base of nasus, and one over the ocelli; antennæ rather long, pilose, third joint as long as width of head; eyes not very large, but prominent, not as high as vertex, which is straight across on top; mesothorax with the usual pale Y-mark, leaving three large black spots; abdomen brown; legs pale yellowish. Wings hyaline, a brown mark at end of anal vein, and from thence a faint brownish cloud obliquely across the wing; pterostigma long, and rounded behind, mostly covered with a large brown spot, and opposite to it on the first posterior vein is a transverse brown spot of about equal size; base of pterostigma white, and before this a black dot; venation mostly brown, but the vein closing cell, and the fork of radial sector are white; cell not pedicellate, about one fourth narrower below, its upper and outer sides subequal; second posterior cell very narrow above. Length 4 mm.

Falls Church, Va., September. Readily known by position of spots on wings.

Psocus medialis, new species.

Head pale, nasus hairy, a dark mark across its base, near base of antennæ, a prominent black spot over ocelli and extending up over middle of the vertex; antennæ pale, paler on base, with many long hairs, third joint less than width of head; eyes large and as high as vertex, which is straight across. Thorax shining black, with the usual pale Y-mark; abdomen (dry) black; legs pale, knees and tarsi blackish. Wings hyaline, a black dot at end of anal vein, also at base of pterostigma, latter barely darker than rest of wing, elongate, and rounded behind; venation brownish, vein closing cell and fork of radial sector white; cell about one half narrower below, outer side plainly longer than upper; in one specimen the cell is plainly pedicellate from radial sector. Length 3 mm.

From Appalachicola, Florida, on oak bark.

Psocus infumatus, new species.

Head pale, nasus lineated with brown in the middle, and a few brown dots on the vertex; antennæ brownish, paler on the base, with very few short hairs, third joint as long as width of vertex; eyes very prominent, but hardly as high as vertex, latter straight across on top. Thorax brown, with the usual pale Y-mark, and a wedge-like pale mark on each lateral lobe; abdomen (dry) brown. Coxæ brown on base, rest paler, femora brownish above, pale below, tibiæ pale, tipped with brown, and tarsi mostly brown. Wings fumose; a brown cloud from tip of anal vein up to the median, a black dot at base of the pterostigma, beyond pale, the apical half brown; veins dark brown, that closing the cell, lower third of outer side of cell, and the fork of radial sector hyaline white; pterostigma angulate behind, rather long, and outer side strongly oblique; cell not pedicellate, almost one half narrower below, outer side plainly longer than upper; first posterior cell shorter on median vein than either the second or third. Length 4.8 mm.

One specimen from Falls Church, Va.

Psocus moderatus, new species.

Head pale, black around the ocelli; antennæ brown, long, very hairy, third joint much longer than width of head; eyes of moderate size, almost as high as vertex, latter straight across on top. Thorax dull brown, no distinct pale marks; abdomen brown; legs pale, tips of tibiæ and the tarsi darker. Wings brownish fumose; the pterostigma rather darker, a black dot at its base, and one at end of the anal vein; venation blackish, the vein closing the cell, the one connecting to hind margin, the lower one fourth of the outer side of cell and the fork of the radial sector hyaline white. Pterostigma elongate, rounded behind; discal cell long, with a long pedicel from radial sector, almost as long as lower side of cell, which is barely one half as long as the upper side; outer side one third longer than upper side. Length 6 mm.

Mt. Katahdin, Maine.

Elipsocus occidentalis, new species.

Head blackish; antennæ pale brownish; thorax black; abdomen (dry) black; legs yellowish brown. Wings hyaline, a dark cloud in middle, a spot on pterostigma, and the upper edge of the first posterior cell margined with brown. Sometimes some or all of these markings lacking (perhaps freshly transformed specimens). Antennæ rather heavy, third joint about as long as width of the head, eyes rather prominent, as high as vertex, which is straight across. Venation as usual, pterostigma long and slender; first posterior cell high, but not very near to median vein; radial sector and median vein united only a short distance before the fork, which is sudden, and very wide at base. Length 2.5 mm.

Several from Victoria, Vancouver Island (Bergroth.)

Class I, HEXAPODA.

Order XI, ORTHOPTERA.

ON SOME FORFICULIDÆ OF THE UNITED STATES AND WEST INDIES.

By A. N. CAUDELL,

WASHINGTON, D. C.

Pyragra buscki, new species.

One male, Baracoa, Cuba, October 14, 1901 (Busck).

Description. — Male. Entire insect considerably flattened, microscopically pubescent and uniformly reddish brown except the base of the wings where the color is much lighter. Antennæ of at least 29 segments, the first and third elongate and equal, the second short; beyond the third segment the joints are short, growing longer and smaller towards the apex of the antenna. Pronotum nearly square, narrowing very abruptly anteriorly, posteriorly broadly rounded. Elytra almost twice as long as broad, not quite as long again as the pronotum, laterally extending well down the sides of the thorax as in the type species; posteriorly the elytra are truncate. Wings extending beyond the elytra a distance equal to scarcely one third the length of the elytra. Legs short and stout, the tarsi with the second joint small and simple, the third furnished with small but distinct pads between the claws. Abdomen without lateral tubercles; pygidium inconspicuous, triangular. Forceps slightly separated basally, short, stout, almost semicircularly rounded and serrate inwardly in the basal half. Length, pronotum, 2 mm.; elytra, 3.5 mm.; forceps, 2.5 mm.

Type. — Cat. no. 10288, U. S. National Museum.

This species is, in some respects, an aberrant member of the genus but goes here by most of the generic tables studied. The pubescence of the body is fine and short, scarcely visible with a common lens. On the tarsi however the hairs are more easily seen.

To this species I refer also an immature specimen bearing the same data as the type. The pads between the claws are not visible in this immature specimen.

Psalis americana Palisot.

Three females, San Francisco Mountains, Santo Domingo, September, 1905.

These specimens were taken by Mr. Busck from a hole over fifty feet above the ground in the side of a palm. The hole was apparently made by wood-rats and several of these rodents were taken in it. Besides rats the hole contained a large number of bats and in the dung and other trash at the bottom of the cavity were found a number of insects, among which were the present specimens.

Psalis pulchra Rehn.

One male, Trinidad, June, 1905 (Busck).

The recently described *Labia pictipennis* of Bruner* is a synonym of this species.

Psalis nigra, new species.

One female, Trinidad, July 4, 1905 (Busck).

Description. — Of small size. Antennæ seventeen jointed, the 13 and 14 or the 12, 13 and 14 joints yellowish, the rest dark brown. Pronotum quadrate, no broader than the head, posteriorly well rounded. Elytra black, about two times as long as broad. Wings projecting beyond the elytra a distance equal to about one half the length of the latter and brown with the central portion tinged with yellowish. Forceps stout, triangular, unarmed, apically bent moderately inwards. Color uniformly black above on head, thorax and abdomen. The legs are light brown, faintly marked longitudinally on the femora with darker brown. The under side of the body is lighter, the ventral surface of the thorax being light yellowish; mouth parts light brown. Length 12.5 mm.; forceps, 2.

Type. — Cat. no. 10290, U. S. National Museum.

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* Journ. N. Y. Ent. Soc., XIV, 138, 1906.

Except for the presence of elytra and wings and the posteriorly more rounded pronotum, this insect bears a most striking resemblance to the specimens herein considered as *Anisolabis antoni.*

Anisolabis annulipes Serv.

The National Museum contains specimens of this species from California, Arizona, Texas, Florida, North Carolina and District of Columbia. Also one immature specimen from Baracoa, Cuba, September, 1901 (Busck).

Anisolabis maritima Bon.

One immature specimen from Nassau, in the Bahamas, is in the National collection, taken December 25, 1898, by Mr. Busck.

Anisolabis antoni Dohrn.

Three females, Trinidad, July, 1905 (Busck).

Anisolabis janeirensis Dohrn.

One male, Fajardo, Porto Rico, February, 1899, and one female, Utuado, Porto Rico, January, 1899, both taken by Mr. Busck.

Anisolabis minuta, new species.

One male, one female, Arroyo, Porto Rico, (types), and three females, Mayaguez, Porto Rico, January, 1899 (Busck).

Description. — Superficially resembling the immature forms of *A. annulipes* with which it is liable to be confused. Readily distinguished from other forms of the genus by the small size and by the presence of small, elongate and widely separated elytra which are almost or quite immovably attached to the thorax. Wings absent. Legs marked with brown on the femora and the antennæ are brown with the basal segments and the twelfth and thirteenth, or the thirteenth and fourteenth ones yellowish. The forceps are short, heavy and unarmed, those of the male strongly bent inwards apically, those of the female less so.

Length, male and female, 10–12 mm.; forceps, male and female, 1.75–2 mm.

Type. — Cat. no. 10289, U. S. National Museum.

The type specimens, the pair from Arroyo, were taken in February, 1899.

Labia burgessi Scudd.

The National Museum contains one female, North Carolina (Fisk); one male, Florida, no definite locality; two females, Palatka and Enterprise, Florida; one male, Willis, Texas.

Labia pulchella Serv.

One male, San Francisco Mountains, St. Domingo, September, 1905 (Busck).

bia trinitatis Bruner.

One male, Trinidad, June, 1905 (Busck); one adult female and e immature female, Dominica, August, 1905 (Busck).

The specimens from Dominica may not belong here. The nymph s the pronotum red, as mentioned as being sometimes the case with *arcuata* by Bormans.*

bia gravidula Gerst.

One female, Botanical Gardens, Jamaica, November 13, 1902; e male, one female, one immature female, Aguadilla, Porto Rico, nuary, 1899 (Busck).

This species I place in the genus *Labia* rather than in the genus *hingolabis* as the characters seem to more logically place it in the rmer named genus.

bia sp.

Three females, Baracoa, Cuba, August and September, 1901 (Busck).

These seem nearer *minor* than any other species of the genus that have seen but these specimens are even smaller than usual in that all species and the color appears darker.

bia brunnea Scudder.

1 ♂, Trinidad, on sweet potato; three females, St. Domingo, ptember, 1905 (Busck).

elisoches morio Fabr.

This species is eligible to entry in the United States fauna, having en taken in some numbers at Menlo Park, California, by Mr. F. rmung. It is not at all rare in some of the Hawaiian Islands.

hingolabis luteipennis Serv.

Seven males, four females, Olivier, Louisiana. These were taken Mr. Titus.

hingolabis linearis Esch.

Four males, ten females, Cayamas, Cuba, May and June (Schwarz).

hingolabis californica Dohrn.

Two males, Cayamas, Cuba, June (Schwarz).

I am quite convinced that this is but a variety of *linearis*.

hingolabis albipes Fabr.

Two males, two females, San Francisco Mountains, St. Domingo, ptember, 1905 (Busck).

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* Biol. Cent.-Amer., Orth., i, p. 6 (1893).

Sphingolabis schwarzi Rehn.

One male, Cayamas, Cuba, May 25 (Schwarz).

This species was described from a single female specimen collected in the same locality by the same collector. It was placed in the genus *Forficula* by the describer but the male shows it to be a member of the genus *Sphingolabis*.

In general appearance of form and color the male is very like the female but the forceps are more elongate and are armed on the inner side with four teeth, the basal and apical ones the shortest, and basally there are a few sharp tubercles on the inner and dorsal surfaces. The pygidium terminates in a blunt cylindrical spine about three times as long as the middle width. The antennæ are twelve jointed. The measurements are as follows: Length, elytra, 4 mm.; wing, 2; forceps, 14.

Sphingolabis buscki Rehn.

Four full grown nymphs, all females, taken in the San Francisco Mountains, St. Domingo, by Mr. Busck in September, 1905. The antennæ of these specimens are unicolorous and the legs are a little lighter in color than in the type specimens but otherwise they agree very well with the types.

This species does not seem to fit very well into the genus *Sphingolabis*, being in general appearance very unlike the other members of the genus. At a casual glance it resembles very much a large *Anisolabis*. It seems to be the insect referred to by Scudder* as *Psalis gagatina*.

Forficula auricularia Linn.

The specimens of this species recorded from Indiana, first by Rehn and later by Blatchley, are not from the United States at all but were taken by Professor Webster in Tasmania where he found them injuring fruit. This information is taken from Webster's original notes.

Forficula auricularia var. **forcipata Steph.**

Specimens of this insect were bred from imported nests of the brown-tail moth at Medford, Massachusetts.

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* Bull. U. S. Geol. & Geogr. Surv. Terr., ii, 250, 1876.

JOURNAL

OF THE

New York Entomological Society.

EDITED BY HARRISON G. DYAR.

Publishes articles relating to any class of the subkingdom Arthropoda, subject to the acceptance of the Publication Committee. Original communications in this field are solicited.

EDITORIAL.

The genus, as primarily and logically defined, is a conception of its author, possessing a certain set of characters, arbitrarily selected. Any species possessing all of these characters, no matter what others, belongs to the genus, and any species not possessing all of these characters does not belong to it. This is the original idea of a genus. If, therefore, an author defines a series of genera to his own satisfaction, and a second author divides the same set of species on other characters, or on the same ones differently combined, none of the genera used by the second author are the same as those of the first. Unfortunately for the plan, a genus carries a name and in the case just supposed none of the generic names proposed by the first author could properly be used by the second author, but he must propose an entirely new set. Now successive authors seldom have the same generic conceptions, while fixity of names is a prime requisite. To bring it about as far as possible, the rule of priority has been invented and it has been decided that no names can be dropped, but every name validly proposed must be forever carried, either as a valid genus or a synonym of some other. Each generic name must depend upon a typical species and any group thereafter formed that contains this typical species must carry that generic name. Thus only can old names be saved and applied to new generic groupings.

The logical result is to completely transform the original idea of a genus. It is no longer a conception of its author, but is dependent upon the characters actually possessed by its type species. From a nomenclatorial view, it is immaterial whether an author describes his genus or not, or whether he describes it wrongly, so long as the type species is ascertained. This once ascertained, the genus is fixed, although the characters of the type species may even contradict those given by the author. What he states can have no weight except as to the mention of the type. It follows that any genus originally containing no species mentioned by name, or only undescribed ones, is invalid and to be ignored, no matter how fully described. It is a *nomen nudum* and that name can be subsequently employed in any sense. It also follows that the question of misidentification does not arise, the species mentioned by the author as his type, or the one determined by rule to be his type, is thereby the type, even though (if the type be an old species) he may obviously describe another.

The idea of Professor Williston, quoted in our last editorial, who says: "I consider a genus as something more than a specimen," is seen to be distinctly archaic and impracticable, while the complaint of Professor John B. Smith, recently published in *Science* that his generic names have been used in another sense than he intended by Sir G. F. Hampson is without justice and due to a failure on the part of Professor Smith to logically view the necessary result of the type idea.

The rule for selecting types of genera when these are not specified by the author becomes of the first importance, and its full discussion at the present time is abundantly justified.

BOOK NOTICE.

A Natural History of the British Lepidoptera, a text book for students and collectors. By J. W. TUTT, F. E. S. Volume V. London: Berlin: 1906.

We have the pleasure to notice another of Mr. Tutt's remarkably full and detailed volumes. This one contains two chapters of general matter entitled respectively "Hybridisation in Lepidoptera" and "Mongrelisation in Lepidoptera," followed by a minute account of the British Pterophorids. *Agdistis* is included, two superfamilies (!) being recognized, the Agdistides and Alucitides. The former contains the family Agdistidæ, the latter the families Platyptilidæ and Alucitidæ, and these are again divided into subfamilies, tribes and genera. We have previously expresssed our opinion that Mr. Tutt gives his groups too high rank, considering the characters on which they are founded and makes too many of them. This criticism applies equally to the present volume. Such things are, however, more or less a matter of opinion and do not seriously mar the pleasure we take in perusing the great mass of detailed facts and interesting generalizations about the British "Plumes" which Mr. Tutt has so assiduously collected and thoughtfully deduced.

PROCEEDINGS OF THE NEW YORK ENTOMOLOGICAL SOCIETY.

MEETING OF NOVEMBER 20, 1906.

Held at the American Museum of Natural History. President C. H. Roberts presided with thirteen members and one visitor present.

The secretary read a letter recently received from Mr. J. R. de la Torre Bueno requesting a grant from the Hermann Fund to carry on some investigations of the life-histories of the aquatic hemiptera.

On motion of Mr. Southwick the letter was referred to the executive committee for action.

Mr. Davis read the resignation of Dr. Otto Seifert. On motion of Mr. Groth action upon this was deferred.

Mr. Southwick moved that amendment of Article V of the by-laws, proposed at the last meeting be accepted. Seconded.

Motion was lost.

Mr. Southwick nominated Mr. Roberts as delegate to the Council of the Academy of Sciences. Carried.

On motion of Mr. Dickerson the president appointed as a committee Messrs. Dickerson, Groth and Davis to confer with a similar committee from the Brooklyn and Newark Societies in order to arrange for a smoker to be given to the entomologists attending the Association for the Advancement of Science during the Christmas holidays.

Mr. Bueno exhibited specimens of *Rhagovelia obesa* Uhl. and discussed the structural characters, habits and development of this species.

Mr. Leng gave some remarks on the Coccinellidæ and pointed out the chief characters used in the separation of certain genera. He exhibited a collection of Coccinellidæ.

MEETING OF DECEMBER 18, 1906.

Held at the American Museum of Natural History. President C. H. Roberts in the chair with twelve members present.

The librarian, Mr. Schaeffer, reported the receipt of the following exchanges:

Zeitschrift f. Wissenschaftliche Insecten biologie, II, Nos. 10 and 11.

On the Diurnal Lepidoptera of the Athabaska and Mackenzie Region, B. C. by Merritt Cary. Proc. U. S. Nat. Mus., No. 1488.

The Digger Wasps of North America and the West Indies. Henry T. Fernald. Proc. U. S. Nat. Mus., No. 1487.

Berliner Entom. Zeitschrift, LI, No. 1.
Proc. American Acad. Arts and Sciences, XLII, Nos. 12 and 13.
Canad. Entom., XXXVIII, Nos. 11 and 12.
Verh. d. k. k. zool. bot. Gesellschaft, Wien, LVI, Nos. 6 and 7.
Science Bull. Brooklyn Inst. Museum, I, No. 9.
Zoological Record, XLII, 1905, Insecta.
Bull. de la Soc. Imp. d. Nat. de Moscow, 1905, Nos. 1, 2, 3.
Proc. Amer. Philos. Soc., XLV, No. 183.
Georgia State Board of Entomology, Bulletin, Nos. 20 and 21.
Wiener Entomolog. Zeitung, XXV, No. 10.
Zeitschrift f. Entomologie, 1906, No. 31.
Deutsche Entomolog. Zeitschrift, 1906, No. 2.

The resignations of Mr. J. R. Bueno and Mr. Chas. Myers were read and accepted with regrets.

Professor Wheeler spoke on "Pink Insects as Mutations." He said that a specimen of a pink katydid had been sent to the Museum in the fall. It was a female and discharged a mass of eggs. He formerly had taken a number of these at Woods Hole, Mass. In literature there are about twenty records of these insects, but the only male known was that taken by Mr. Scudder. Pink insects were also found in other orders and occurred both in green and brown forms. Scudder considered these pink forms as sports. An attempt should be made to breed these forms to determine constancy of color. He exhibited a number of pink Orthoptera and Hemiptera.

Mr. Joutel asked if these variations were produced by climatic variations, as he had found pink sphinx larvæ on grape in fall when leaves were turning. Dr. Wheeler stated that he had taken them early in season as had also Mr. Davis and that the pink variation was due to difference in pigmentation.

Mr. Joutel spoke of the experimental work he had been doing in crossing *promethea* ♀ moth with *cynthia* ♂, and from these had obtained fertilized eggs from which he had secured a distinct type of larva and cocoon which he exhibited.

Mr. Joutel also exhibited a box showing all of the North American forms of the genus *Strategus*, as well as some Cuban and Mexican species, and a *Passalus* from California which was evidently new to the fauna of the United States. *Strategus mormon* from California was one of the insects exhibited and Mr. Schaeffer spoke of this as being very rare.

Mr. Schaeffer gave "Some Notes on Bruchidæ." While collecting in Texas and Arizona he had taken several new species. Many were found on oak and on account of the kinds of plants many of the species were collected on, he thought that some of them must breed in something besides seeds. He then spoke of several of the species and the characters used in separating them. Dr. Horn had based his studies on the denticles, but did not mention the variations that occurred. He had found much variation in these structures as well as in the pygidium. Dr. Sharp had based his studies on the form of the insect, but in this also Mr. Schaeffer said he had found considerable variation, so that a long series of these insects was necessary in studying them.

Mr. Leng asked what characters had been found outside of the denticles. Mr. Schaeffer said good characters could be found in the antennæ but these differed much in the sexes and so were difficult to use in separating the species.

Mr. Roberts asked about the tarsal characters. Mr. Schaeffer said that the legs were difficult to examine but undoubtedly good characters could be found there.

Mr. Leng exhibited a specimen of *Neoclytus joutelii* Davis, a longicorn beetle previously known only by the type and stated that Mr. Bischoff, of Newark, had taken the specimen shown as well as one other at Lakehurst, N. J., on July 7, 1906, by beating oak trees. The type had also been taken at Lakehurst. Mr. Leng also exhibited a specimen of *Anistoma alternata* Melsh., a beetle of the family Silphidæ which is new to the List of the Insects of New Jersey. This species is included in the Washington list. The specimen shown was captured by Mr. W. T. Davis on Staten Island in October.

In discussing the subject of albinism Mr. Southwick said plants often exhibited this and asked about its occurrence in higher animals. Dr. Wheeler said that he had found no albinistic forms among ants but that occasionally such forms appeared among wild animals but that it was only among domesticated animals that we have albinistic races.

Dr. Wheeler invited the society to meet in his room in the future.

ANNUAL MEETING OF JANUARY 15, 1907.

Held at the American Museum of Natural History. President C. H. Roberts presided with fifteen members and one visitor present.

The treasurer, Mr. Davis, read his annual report which showed the Society's balance as $772.28, and the Journal's $200.56.

The chairman of the nominating committee, Mr. Joutel, placed in nomination the following ticket:

President — C. W. Leng.
Vice-president — E. B. Southwick.
Treasurer — W. T. Davis.
Corresponding and Recording Secretary — H. G. Barber.
Librarian — C. Schaeffer.
Executive Committee — Messrs. Groth, Watson, Beyer, Harris and Wheeler.
Publication Committee — Messrs. Love, Schaeffer, Bird and Dyar.

On motion of Mr. Groth the secretary cast one ballot in favor of the nominations as read.

The librarian reported the receipt of the following exchanges:

Remplacement des Muscles Vibrateurs du vol par les colonnes d'adipocytes, chez les Fourmis, après le vol nuptial, by Chas. Tanet.

Anatomie de la tête du Lasius niger, by Chas. Tanet.

Georgia State Board of Entomology Bull. 22.

Field Tables of Lepidoptera by Wm. J. M. Forbes.

Proc. of the Davenport Academy of Sciences, Vol. XI, pp. 1–124.

Dr. E. P. Felt, Mr. E. A. Bischoff and Mr. J. R. de la Torre Bueno were proposed as active members.

Professor John B. Smith was proposed as a corresponding member.

Mr. Joutel exhibited a small cocoon of a moth belonging to the Eucleidæ which was taken at Albany, April 5, 1906, collected and sent to him by Dr. Felt. He remarked that it was of interest because as yet it was not generally distributed and this was the first specimen known to have been taken in New York State. Dr. Fernald has recorded it as being introduced into Massachusetts where it occurred restricted to a very small locality. He spoke of the habit of the caterpillar of placing its cocoon at the tip end of the branches where it was difficult to remove them without breaking the branches.

Mr. Zabriskie exhibited a parasitic hymenopteron, one of the Chalcididæ similar to those mentioned by Professor Wheeler as occurring with ants. This specimen was taken by sweeping the herbage.

Mr. Joutel exhibited a pamphlet written by Spinola in 1839 in which were described and figured a few species of peculiar Coleoptera.

Professor Wheeler exhibited some ants recently received from British Honduras collected by Mr. Johnson — one species of which has very rarely been seen in collections. Mr. Johnson had sent a large series of the driver ant. Professor Wheeler described the habits of these ants. He told of their carnivorous food habit and how they moved in great armies through the tropical forests devouring all insects and even larger animals in their way. They move along just under the surface of the ground and are consequently blind. They come to the surface of the ground and can be found beneath stones, boards and leaves which may serve as a sort of roof to their galleries. The differences between the individuals of the various castes were pointed out and comparisons made between these and similar ants in other parts of the world.

In answer to Mr. Leng's question as to how much territory they covered in their migrations Professor Wheeler stated that that had never been determined as they were rather mysterious in their habits. The males and females are so different that they have been put in separate genera and even classified in separate families by Cresson. The females are very rare. They have no wings and are very large bodied being probably dragged along by the other members in their migrations. The workers have a rank and nauseating odor while the males and females are sweet smelling. Furthermore these ants have more myrmecophiles than any other known ant, many of which resemble the ant so closely that they have been overlooked. Among the mymecophiles most common are various species of Staphylinidæ which are not necessarily mimetic in color but merely in form.

Mr. Davis exhibited five local species of the large red ant belonging to the genus *Formica* and remarked that four of them had been taken on Staten Island. He spoke of the habits of each of these species.

Mr. Watson exhibited specimens of the *cynthia* moth showing a peculiar aberration with a darker band along the outer margin of the wings. These were bred from cocoons obtained in Bronx Park. Some specimens obtained in the same lot were typical.

Mr. Schaeffer stated that while in Brownsville, Tex., he and Mr. Doll had brought back two or three thousand cocoons of a Bombycid moth (*Agapema galbina*), a large number of which hatched out in September and October, 1903, and every fall since a diminishing number had hatched out and even yet a few are left which will probably hatch out this fall. He asked if anyone could explain this.

Mr. Davis suggested that that was a possible provision of nature for these to hold over in this locality for a considerable time to wait for a suitable wet season for hatching out; that they might even hold over for several years if the season was unfavorable.

This led to considerable discussion as to the effect of cold, heat, moisture, etc., in either retarding development or effecting the colors of the mature insect.

THE

NEW YORK ENTOMOLOGICAL SOCIETY.

Organized June 29, 1892.—Incorporated June 7, 1893.

The meetings of the Society are held on the first and third Tuesday of each month (except June, July, August and September) at 8 P. M., in the AMERICAN MUSEUM OF NATURAL HISTORY, 77th Street and Eighth Ave.

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The above papers will be sent on receipt of price by

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BROOKLYN, N. Y.

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Class I, HEXAPODA.

Order I, HYMENOPTERA.

NEW NORTH AMERICAN HYMENOPTERA.

BY J. C. CRAWFORD,
WASHINGTON, D. C.

Superfamily CHALCIDOIDEA.

Subfamily MONODONTOMERINÆ.

The genus *Diomorus* Walker has the mesepisternum deeply incised above the middle and will therefore have to be placed in the Toryminæ, where it can be separated from the other genera by the tooth on the hind femora. In his classification of the Chalcidoidea, Dr. Ashmead has used the presence or absence of teeth on the hind femora as a secondary character to separate the Toryminæ and the Monodontomerinæ. This will have to be dropped or at least modified to show the above exception.

The following table will separate the winged forms belonging to the subfamily and define three new genera. The table has been made to include all of the genera which were put in this group by Dr. Ashmead, except *Diomorus*, to show more clearly the affinities of the new genera.

TABLE OF GENERA OF MONODONTOMERINÆ.

1. Antennæ with two ring joints.................................*Plesiostigmodes* Ashm.
   Antennæ with only one ring joint..2
2. Scutellum with a cross furrow before apex.................................3
   Scutellum without a cross furrow before apex..............................5

3. Apical margin of first abdominal segment not incised medially. *Monodontomerus* Ashm.
Apical margin of first abdominal segment incised medially..........................4
4. Hind femora with two large teeth..................................*Physothorax* Mayr.
Hind femora with one large tooth..................................*Plesiostigma* Mayr.
5. Metathorax with spiraclar sulci..................................*Hemitorymus* Ashm.
Metathorax without spiraclar sulci..................................6
6. Occipital foraminal depression immargined..................................7
Occipital foraminal depression margined..................................8
7. Metathorax in ♀ with two medial carinæ, area between smooth but basad with two foveæ separated by a short carina; in ♂ the carinæ weak; first abdominal segment deeply incised medially......................*Ditropinotus* gen. nov.
Metathorax not with two medial carinæ; first abdominal segment not deeply inincised medially..................................*Microdontomerus* gen. nov.
8. Apical margin of first abdominal segment not incised medially....................9
Apical margin of first segment incised medially..................................10
9. Eyes conspicuously hairy..................................*Oligosthenus* Först.
Eyes not conspicuously hairy..................................*Cryptopristus* Först. ♂
10. Wings without a stigmal cloud..................................11
Wings with a stigmal cloud..................................*Cryptopristus* Först. ♀
11. Hind femora with a large tooth or prominent dentiform angle; metathorax not with two medial carinæ..................................12
Hind femora without a large tooth or dentiform angle; metathorax with two medial carinæ ♀, in ♂ obsolete........................*Eridontomerus* gen. nov.
12. Hind femora basad of large tooth distinctly serrate..............*Websterellus* Ashm.
Hind femora basad of large tooth not with small teeth or serrations. *Holaspis* Mayr.

Ditropinotus, new genus.

Type. — *D. aureoviridis* Crawford.

The punctures of the head and thorax are thimble-like; hind femora with a few minute saw-like teeth; antennæ ♀ with the club only slightly thicker than funicle, in ♂ not thicker; joints of antennæ loosely put together; abdomen in ♀ triangularly produced beneath; metathorax wrinkled; a basal fovea laterad of each carina; coxal cavities and place of insertion of abdomen above with a strong carinate ridge.

Ditropinotus aureoviridis, new species.

♀. — Head and thorax golden green, pleuræ more or less, under sides and abdomen dark honey color; punctures of head and thorax coarse, strong; antennæ dark, scape more or less and club almost orange color; from between antennæ to apex of clypeus a more or less distinctly elevated ridge; legs testaceous, hind femora, except tips, and hind tibiæ, except apices, almost the color of the abdomen; front coxæ testaceous; middle coxæ slightly and hind almost entirely, greenish; abdomen transversely lineolate, with some green laterally at times, compressed, ovipositor about half as long as the abdomen. Length 3-3.5 mm.

♂. — Entirely green, not so yellowish in color as the ♀, antennæ all dark, legs testaceous, coxæ and femora except apices green; sculpture of abdomen coarser than in ♀. Length about 2 mm.

Locality. — Hudson, Mich., Webster, No. 3375 (W. J. Phillips coll.); Richmond, Ind., Webster, No. 2216 (W. J. Phillips coll.) all from *Isosoma* in wheat.

Type. — No. 10043, U. S. National Museum.

Microdontomerus, new genus.

Type. — *Torymus anthonomi* Crawford, Can. Ent., XXXIX, 133, 1907.

The head and thorax with thimble-like punctures, the antennæ slightly clavate, the joints fitting closely, metathorax with a median carina and several short ones on each side of the median one; teeth on hind femora minute.

Eridontomerus, new genus.

Type. — *E. primus* Crawford.

Punctures of head and thorax thimble-like; antennæ distinctly clavate, the joints close fitting; hind femora with small teeth, two or three of the largest distinctly almost semicircularly emarginate at apex; metathorax similar to *Ditropinotus*.

Eridontomerus primus, new species.

♀. — Head and thorax rather brassy green, face bronzy; abdomen black tinged with brassy on sides; antennæ dark becoming reddish apically; punctures of head and thorax coarse; femora except tips black with greenish reflections; tibiæ medially brown, tips of femora, bases and apices of tibiæ testaceous, tarsi whitish; carinæ of metathorax strong, foveæ between the carinæ not deep, the outer ones very distinct; rest of metathorax finely roughened; abdomen reticulately lineolated. Length about 2.5 mm.

♂. — Similar to ♀ but green brighter, not brassy; femora and hind tibiæ except bases and tips green; knees, tibiæ and tarsi whitish; antennæ dark, the tips only slightly lighter. Length 1.5–2 mm.

Locality. — Richmond, Ind., bred from *Isosoma* in timothy (W. J. Phillips), Webster, Nos. 2895 and 2207.

Type. — No. 10044, U. S. National Museum.

Tribe PEDIOBIINI.

Eriglyptus, new genus.

Type. — *E. robustus* Crawford.

Form robust, convex, head and thorax with coarse thimble-like puntures, antennæ 8-jointed with no ring joint, the joints loosely joined, club 3-jointed hardly thicker than the funicle, the last joint reduced almost to a spine; face when viewed from above slightly convex, vertex meeting the occiput in a sharp carina extending from eye to eye; submarginal vein long but not as long as the marginal, stigmal knob sessile, postmarginal vein hardly longer than the stigmal knob; metathorax with a distinct median carina; petiole of abdomen very short the abdomen being almost sessile, abdomen of ♀ about as long as the head and thorax, of ♂ about as long as the thorax.

Most closely related to *Nesomyia* but differs in the convex form, absence of ring joint, short postmarginal vein, carinate vertex, convex face (in *Nesomyia* the face viewed from above is strongly concave), etc.

Eriglyptus robustus, new species.

♀. — Length 2.5 mm. Head and thorax blue, with green reflections in places, face and under parts deeper blue, almost purple in places, dorsum of thorax except lateral areas of mesothorax mostly æneous; antennæ blue; abdomen blue, with greenish in places; legs blue, tibia apically and tarsi except the dark apical joint, white.

♂. — Length 2 mm.; similar to ♀ but above mostly green, face with green, pleuræ and below blue; abdomen basally with a white spot.

Locality. — Washington, D. C., parasite of *Anthonomus nigrinus.*

Type. — No. 10045, U. S. National Museum.

Tribe ENTEDONINI.

Horisemus lixivorus, new species.

♀. — Head and thorax dark olive green above, the scutellum often dark purplish; face and under parts of thorax coppery green; abdomen black, shiny, base of first segment greenish; mesonotum and scutellum finely reticulated; coxæ and femora green, tibiæ dark; tips of femora, bases and apices of tibiæ and tarsi, except apical joint, whitish; petiole of abdomen very short; first segment of abdomen over one third the length of abdomen, apically finely reticulated as are the remaining segments. Length about 1.75 mm.

♂. — Similar except for sexual characters. Length about 1.25 mm.

Type locality. — Dallas, Texas, Oct. 2, 1906, bred from *Lixus musculus* (W. D. Pierce); also from Victoria, Texas, Apr. 4–7 (W. E. Hinds coll.).

Type. — No. 10046, U. S. National Museum.

The dark legs readily separate this species from the others, except *microgaster,* which has the first segment of the abdomen over one half the length of abdomen and punctured apically.

Tribe TETRASTICHINI.

Aprostocetus diplosidis, new species.

♀. — Black, shiny, eyes reddish brown; antennæ brown; sculpture of mesothorax exceedingly minute longitudinal lines, making the surface silky in appearance;

median groove very apparent; parapsidal grooves very deep; grooves on scutellum very plain; femora and coxæ dark, bases and apices of femora, and rest of legs yellow; abdomen very finely reticulately lineolated, about twice as long as the head and thorax combined. Length including ovipositor about 2 mm.

♂. — Very similar to the ♀ but the abdomen only as long as the head and thorax together. Length about 1 mm.

Locality. — Bred from *Diplosis sorghicola*, collected at Baton Rouge, La. (Webster No. 3630).

Type. — No. 10929, U. S. National Museum.

Differs from *americanus* in the very apparent median groove on the mesothorax; from *granulatus* in the sculpture of the mesothorax.

Superfamily ICHNEUMONOIDEA.

Urosigalphus bruchi, new species.

♀. — Black, head and thorax rather finely rugoso-punctate; antennal grooves deep, reaching to vertex; antennæ 14-jointed, reddish, reaching to metathorax; median area of mesothorax coarsely rugose, lateral areas shiny, finely sparsely punctured; scutellum strongly elevated, viewed laterally its outline sharply angulated; median carina of metathorax ending in a sharp, short projection; scutellum, post-scutellum and base of metathorax rugose; truncation sparsely rugoso-punctate; hind coxæ large; hind femora robust, their tarsi dusky; wings dusky, nervures light, stigma large, dark; longitudinal striæ on abdomen distinct for about two thirds the length of the abdomen; ovipositor about one third the length of abdomen; apex of abdomen produced to two short spines. Length 3.75–4 mm.

♂. — Similar, antennæ reaching one third distance to apex of abdomen; abdomen at apex only indistinctly spined. Length 3.75 mm.

Locality. — Victoria, Texas, bred from *Bruchus* in *Prosopis.*

Type. — No. 10047, U. S. National Museum.

This species is the size of *anthonomi* but is easily distinguished by the absence of the pyramidal area between the ocelli and by the sharply elevated and angulated scutellum (in *anthonomi* the scutellum seen in profile is rounded above).

Superfamily APOIDEA.

Neolarra congregatus, new species.

♀. — Head and thorax black, coarsely, deeply and closely punctured, closely covered with scale-like pubescence almost concealing the surface, grayish above white on pleuræ; facial quadrangle broader than long; punctures on clypeus smaller, mandibles reddish apically; flagellum dull reddish beneath; tegulæ large, black, punctured all over; legs dark, knees and tibiæ apically, somewhat reddish; abdomen with segments 1–4 red, apical segments darker, all closely coarsely and deeply punctured; segments 1–5 with bands of white appressed pubescence on the apical margins; venter red. Length 5–5.5 mm.

♂. — Similar, differing in sexual characters; segments 1-6 having bands on apical margins. Length 5-5.5 mm.

Locality. — Cotulla, Texas, May 9, 1906, on *Verbesina encelioides* (F. C. Pratt and J. C. Crawford colls.).

Type. — No. 10049, N. S. National Museum.

The specimens were almost always found congregated on particular flower heads, from six to ten often being taken on a single head. Nor were any found on other flowers of the same species growing just across the road, although they were very abundant in the field where the specimens were collected.

This species differs from *verbesinæ* by the darker colored abdomen, the stronger punctures on the abdomen, the dark tegulæ and legs.

Conanthalictus cotullensis, new species.

♀ ♂. — Green, with a strong silky luster, head and thorax tesselate; mandibles yellowish, the tips red; clypeus apically black, fringed with long hairs; antennæ brown, lighter below, in the ♀ reaching to prothorax, in the ♂ to the tegulæ; tegulæ yellowish hyaline; wings smoky hyaline, nervures light, stigma brown; metathorax with very close, fine punctures, the surface like a small honeycomb; legs dark, femora with a greenish luster, tibiæ apically and tarsi reddish; abdomen green-very strongly silky from very minute transverse lines; broad apical margins of segments brownish; apical fimbria sooty brown. Length about 3.5 mm.

Locality. — Cotulla, Texas, May 10, 1906, on *Marilaunidium organifolium* (F. C. Pratt and J. C. Crawford colls.).

Type. — No. 10048, U. S. National Museum.

This species was compared with *conanthi* by Professor Cockerell and said to differ by its smaller size, dark tibiæ, darker stigma and nervures and greener color.

In this species the relative lengths of the joints of the maxillary palpi are 6, 9, 12, 12, 8, 8; of the labial palpi 8, 4, 4, 6; the tongue is more elongate than in *Halictus*. There is not a trace of an anal rima in the female in this or the other species of the genus.

Sphecodosoma, new genus.

Type. — *S. pratti* Crawford.

In appearance like the genus *Sphecodes* but the basal nervure is only gently curved, the mouth parts elongate, the tongue linear, about ten times as long as broad, the scopa strong; insertion of antennæ less than one third the distance from clypeus to ocelli; the labial palpal joints have the following relative lengths: 25, 17, 12, 12; the maxillary palpi 21, 60, 60, 20, 16, 16; mandibles dentate.

Sphecodosoma pratti, new species.

♀. — Head and thorax black, shiny, abdomen dark red; pubescence sparse, rather long, glistening white; head elongate, facial quadrangle slightly longer than wide; eyes narrow, inner orbits straight parallel; head almost impunctate; clypeus produced, with a few punctures; mandibles red, bases black; antennæ clavate, funicle reddish below, scape reaching about one half way to ocelli; mesothorax slightly lineolated, scutellum more plainly so, both finely sparsely punctured more closely so at posterior edges; median and parapsidal grooves apparent but not deep; metathorax basally with fine rugulæ not reaching to apex, leaving a smooth shiny margin; truncation smooth, not surrounded by a carina; mesopleuræ smooth, indistinctly lineolated, metapleuræ distinctly so; tegulæ large, shiny, black inwardly, the rest translucent; wings dusky, nervures and stigma dark brown; third submarginal narrowed one half to marginal; legs black, femora robust, pubescence glistening white; first segment of abdomen black at base, smooth, sparsely punctured, remaining segments sparsely punctured, finely lineolated; pubescence on fifth segment at apex, sooty brown. Length 4 mm.

♂. — Similar, antennæ not clavate, reaching almost to metathorax, more yellowish below, abdomen black. Length 4 mm.

Locality. — Cotulla, Texas, May 10, 1906, on *Marilaunidium organifolium* (F. C. Pratt and J. C. Crawford colls.).

Type. — No. 10050, U. S. National Museum.

It resembles the genus *Proteraner* in that both sexes come out at the same time in the spring, which is not the case in the other forms.

NOTES ON SOME SPECIES OF THE GENUS HALICTUS.

BY J. C. CRAWFORD,

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The species included in this paper are those which have no green on them and which are found in the United States and Canada. In using the table it will be necessary to consult the detailed descriptions of the species before one can be certain of the identifications, since there are still many undescribed forms in North America.

TABLE FOR THE FEMALES.

1. Apical margins of abdominal segments with hair bands; none of the wing veins obsolescent........2
   No hair bands on apical margins of segments; some of the wing veins obsolescent........5
2. Cheeks armed with a strong spine........*ligatus* Say.
   Cheeks not armed........3

3. Legs mostly red...*parallelus* Say.
Legs mostly dark ; red, if any, confined to hind legs..................................4
4. Hair bands cream colored, very broad ; tegulæ almost impunctate. *farinosus* Smith.
Hair bands white, narrow ; tegulæ punctured except medially. *lerouxii* Lepeletier.
5. Second transverse cubital not obsolescent..................................6
Second transverse cubital obsolescent..................................16
6. Base of metathorax finely wrinkled..................................7
Base of metathorax coarsely rugose..................................13
7. Mesothorax almost impunctate..................................*titusi* Crawford.
Mesothorax closely punctured..................................8
8. Truncation of metathorax surrounded by a salient rim..........*fuscipennis* Smith.
Truncation not surrounded by a salient rim..................................9
9. Punctures of mesothorax very dense, separated from each other by less than their own diameter..................................*bardus* Cresson.
Punctures of mesothorax more sparse, widely separated, at least medially......10
10. Hind tibiæ, hind and middle tarsi red..................................*mellipes* Crawford.
Legs dark..................................11
11. Base of metathorax separated from truncation by a sharp ridge...*coriaceus* Smith.
Base of metathorax without a sharp ridge at rear..................................12
12. Wings yellowish, hair bands creamy or yellowish...............*trizonatus* Cresson.
Wings grayish, hair bands white..................................*forbesii* Robertson.
13. A band on the middle of first segment ; wings very clear.....*sisymbrii* Cockerell.
No band on first segment ; wings more dusky..................................14
14. Rugæ finer, straight, parallel..................................*olympiæ* Cockerell.
Rugæ coarse, irregular, not parallel..................................15
15. Base of metathorax with a semicircular enclosure..............*pacificus* Cockerell.
Base of metathorax without a semicircular enclosure....................*similis* Smith.
16. Abdomen red..................................17
Abdomen not red..................................19
17. Pubescence of head and thorax appressed, mesothorax very shiny, almost impunctate ; abdomen with apical segments largely black.......*arizonensis* n. sp.
Pubescence of head and thorax not appressed..................................18
18. Facial quadrangle much longer than broad, punctures of head strong. *ovaliceps* Cockerell.
Facial quadrangle not much longer than broad, punctures of head indistinct. *swenki* Crawford.
19. Tegulæ large, punctured all over..................................20
Tegulæ not large and punctured all over..................................22
20. Metathorax with a small triangular enclosure................*nelumbonis* Robertson.
No triangular enclosure on metathorax..................................21
21. Mesothorax coarsely punctured..................................*kincaidii* Cockerell.
Mesothorax finely punctured..................................*glabriventris* Crawford.
22. Legs entirely light testaceous..................................*birkmanni* Crawford.
Legs mostly dark..................................23
23. Metathorax except basal enclosure covered with pubescence concealing the surface, especially on truncation..................................24

Surface of metathorax not concealed by pubescence....................................25

24. Mesothorax shiny, sparsely punctured, not distinctly lineolated. *angustior* Cockerell.

Mesothorax dull, closely punctured, distinctly lineolated.....*robertsoni* Crawford.

25. Inner spur of hind tibiæ simple, or with saw-like teeth, or very oblique teeth hardly longer than broad at base..26

Inner spur with long spines, the basal ones at least being several times as long as broad at base..31

26. Mesothorax very dull from lineolation; facial quadrangle longer than broad. *dasiphoræ* Cockerell.

Mesothorax somewhat shiny, facial quadrangle as broad or broader than long...27

27. Base of metathorax coarsely rugose; truncation coarsely sculptured. *arcuatus* Robertson.

Base of metathorax finely wrinkled; truncation not coarsely sculptured.........28

28. First abdominal segment closely, strongly punctured, size large, about 9 mm. *robustus* Crawford.

First segment sparsely weakly punctured, smaller 29

29. Wings clear hyaline, abdomen brownish, apical margins broadly whitish. *amicus* Cockerell.

Wings dusky, abdomen darker..30

30. Face above antennæ closely punctured; metathorax finely irregularly wrinkled. *latifrons* Crawford.

Face above antennæ sparsely indistinctly punctured; metathorax with fine irregularly longitudinal rugulæ...*pecosensis* Crawford.

31. Inner hind spur with many long teeth...........................*pectinatus* Robertson.

Inner hind spur with 2–7 teeth...32

32. Antennæ red beneath; abdomen brown, the first segment strongly transversely striate..*subobscurus* Cockerell.

Antennæ darker beneath, abdomen darker, first segment at most finely transversely lineolate 33

33. First abdominal segment closely distinctly punctured all over. *fedorensis* Crawford.

First segment impuncate or sparsely punctate apically 34

34. Stigma brown, usually very dark..35

Stigma honey color 38

35. Base of metathorax finely wrinkled, rounded behind...................................36

Base of metathorax rugose, ending at a carina of enclosure 37

36. Wrinkles of metathorax more numerous, punctures of mesothorax sparser, weaker, punctures of face less strong............................*quadrimaculatus* Robertson

Wrinkles of metathorax less numerous, punctures of mesothorax closer, stronger, punctures of face stronger ....*divergens* Lovell.

37. Rugæ of metathorax stronger, enclosure semicircular, distinct, punctures of mesothorax strong, coarser..*pectoralis* Smith.

Rugæ of metathorax weaker, enclosure indistinct, punctures of mesothorax finer, sparser...*pectoraloides* Cockerell.

38. Larger species over 8 mm..42

Smaller species not over 7 mm..39

39. Abdomen bare, no hair patches or appressed pubescence on segments; facial quadrangle slightly longer than broad............................*foxii* Robertson.
Abdomen with hair patches of appressed pubescence on bases of segments; facial quadrangle as broad, or broader than long.. 40
40. Abdomen brown, rather dull, patches large, covering fourth segment entirely. *cordleyi* Crawford.
Abdomen darker, shiny, patches of hair smaller, not covering fourth segment....41
41. Smaller, less than 6 mm.; wrinkles of metathorax few, failing apically, wings hyaline..*nigrescens* Crawford.
Larger, 7 mm.; wrinkles of metathorax more numerous, reaching to apex, wings yellowish ....*niger* Viereck.
42. Wings clear, hyaline, veiy ample; wrinkles of metathorax not reaching to apex 43
Wings yellowish or dusky, wrinkles or rugæ reaching to apex.........................44
43. First abdominal segment very delicately but distinctly punctured; punctures of mesothorax sparser ....*aberrans* Crawford.
First segment almost entirely impunctate; punctures of mesothorax closer. *galpinsiæ* Cockerell.
44. Mesothorax dull from strong lineolation 45
Mesothorax shiny, lineolation obscure...46
45. Smaller, hardly 7.5 mm.; abdomen shiny, basal hair patches distinct. *niger* Viereck.
Larger, over 8 mm.; abdomen dull, hair patches not apparent..*quebecensis* n. sp.
46. Rugæ of metathorax very coarse, punctures of mesothorax sparser. *truncatus* Robertson.
Rugæ of metathorax fine, punctures of mesothorax close.........*cooleyi* Crawford.

The following species are not included in the above table: *fartus* Vachal; *lusorius* Cresson; *crassicornis* Kirby; *discus* Smith which would run to *similis* in the table; *egregius* Vachal which is, I think, *trizonatus* or a closely allied form; *diatretus* Vachal and *synthyridis* Cockerell which would both run close to *foxii* in the table and which are closely related to each other, especially in the males.

The following table will serve to separate all the species known to me in the male sex and the notes to indicate where some of the others will run.

TABLE FOR THE MALES.

1. Apical margins of abdominal segments with strong hair bands.........................2
No hair bands on apical margins of segments..5
2. Wings deep yellowish; legs yellow and red...........................*parallelus* Say.
Wings not deep yellow; legs yellow and black..3
3. Antennæ fulvous beneath...*ligatus* Say.
Antennæ only obscurely reddish beneath...4
4. Tegulæ coarsely punctured all over.................................*lerouxii* Lepeletier.
Tegulæ not punctured all over...*farinosus* Smith.

5. Face and legs entirely dark......6

Face and legs not entirely dark......10

6. Tegulæ punctured all over; base of metathorax with a triangular enclosure. *nelumbonis* Robertson.

Tegulæ not punctured all over; metathorax not with a triangular enclosure......7

7. Small species, about 5 mm......8

Larger species, 7 mm. or more......9

8. Punctures of mesothorax fine, sparse; rugæ of metathorax finer, enclosure indistinct......*pectoraloides* Cockerell.

Punctures of mesothorax coarse, close; rugæ of metathorax coarse, enclosure semicircular, distinct......*pectoralis* Smith.

9. Wings clear, pubescence grayish......*sisymbrii* Cockerell.

Wings dusky; bands on abdomen not complete......*olympiæ* Cockerell.

10. Clypeus light anteriorly, legs dark......11

Legs more or less light......14

11. Head large quadrate, mandibles long, apex of one reaching to base of other. *coriaceus* Smith.

Head and mandibles normal......12

12. Base of metathorax coarsely rugose......*similis* Smith

Base of metathorax finely wrinkled *......13

13. Wings dusky, metathorax at apex with a carina......*fuscipennis* Smith.

Wings yellowish, no carina at apex of metathorax......*trizonatus* Cresson.

14. Only the tarsi whitish......15

Tibiæ more or less light......17

15. Head and thorax smooth, shiny, almost impunctate, pubescence long, abundant. *titusi* Crawford.

Head and thorax closely punctured......16

16. Smaller, antennæ red beneath......*ruficornis* Crawford.

Larger, over 8 mm., antennæ dark beneath......*forbesii* Robt.

17. Pubescence of head and thorax appressed, scale-like......*galpinsiæ* Cockerell.

Pubescence of head and thorax not appressed......18

18. Antennæ short, hardly reaching the tegulæ......*foxii* Robertson.

Antennæ long, reaching to metathorax at least......19

19. Tubercles dark †......20

Tubercles with a light spot. ‡......23

20. Hardly 5 mm. long......*quadrimaculatus* Robertson.

Over 6 mm. long......21

21. Mesothorax dull from strong lineolation......*niger* Viereck

Mesothorax shiny, lineolation obscure......22

22. Face narrow, metathorax finely rugose......*pullilabris* Vachal

Face broad, metathorax coarsely rugose......*arcuatus* Robertson.

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* Here apparently run *diatretus* Vachal and *synthyridis* Cockerell, which are much smaller species.

† Here run *pacificus* Cockerell; *granosus* Vachal; *peraltus* Cockerell; *nigricollis* Vachal, all unknown to me.

‡ Here run *arctous* Vachal; *gularis* Vachal; *nigridens* Vachal which I have not seen.

23. Antennæ reddish beneath, mesothorax dull, the punctures minute; about 6½ mm. long .... *cordleyi* Crawford.
Antennæ dark beneath, mesothorax shiny, punctures larger, about 8 mm. long ... 24
24. Rugæ of metathorax very coarse .... *truncatus* Robertson.
Rugæ of metathorax fine 25
25. Punctures of mesothorax close, of first abdominal segment distinct. *cooleyi* Crawford.
Punctures of mesothorax sparse, of abdomen minute .... *aberrans* Crawford.

The following, described from the males only, have not been placed: *distinctus* Provancher, *cinctipes* Provancher.

Halictus bardus Cresson.

I have not seen authentic material of this species and the identification may be wrong.

Halictus trizonatus Cresson.

Either this is a very variable species or there are several closely allied species in the western United States, but it will take a large series of specimens to decide this point. *H. egregius* Vachal seems to belong here and also the male described by him as *colatus*.

Halictus similis Smith.

The species which I have always called by this name, is called *discus* by Professor Cockerell, according to notes sent me by Mr. J. H. Lovell. The two species would run out at the same point in the table. Comparison with the types is needed to determine which species is found in the New England states.

Halictus subobscurus Cockerell.

Comparison of the types shows the species described by me as *cockerelli* to be a synonym of this species.

Halictus divergens Lovell.

This is very closely allied to *quadrimaculatus* and may be only a variety.

Halictus diatretus Vachal and **Halictus synthyridis Cockerell.**

These seem to be very close to each other and to *foxii* but both differ from that species in the males having the legs entirely dark.

Halictus truncatus Robertson.

H. fulgidus Crawford will have to go as a synonym of this species.

Halictus galpinsiæ Cockerell.

In the females this species and *H. aberrans* Crawford are very closely related as shown by the table but in the males they are easily separated, the male of *galpinsiæ* having appressed pubescence. This seems without any doubt to be the form described by Vachal as *gelidus*

Halictus arizonensis, new species.

♀. — Head and thorax black, shiny, almost impunctate and covered with appressed white pubescence; antennæ beneath, clypeus apically, tubercles and legs reddish testaceous; metathorax finely wrinkled at base, the apex smooth, shiny; wings white, stigma and nervures very light testaceous, only the subcosta dark; hind inner spur with about three long teeth; first two segments of abdomen mostly reddish, rest black medially, laterally reddish, except the last which is entirely reddish; apical margins of segments broadly whitish. Length about 5¼ mm.

One specimen from Arizona in the C. F. Baker collection.

Type. — No. 10930, U. S. National Museum.

Halictus quebecensis, new species.

♀. — Black, head and thorax lineolate, dull, facial quadrangle about square, face below antennæ sparsely finely obliquely punctured, punctures opening downward and outward; punctures at sides of face becoming close only some distance above antennæ; rest of face above antennæ closely finely punctured; vertical striæ of the cheeks very apparent; pubescence of head and thorax short, thin, ochraceous; mesothorax finely rather sparsely punctured; median groove well impressed, parapsidal grooves distinct; mesopleuræ rather finely rugulose, metapleuræ anteriorly finely so, posteriorly finely lineolate and only slightly rugulose; base of metathorax with a few rather strong irregular longitudinal plicæ reaching apex; truncation finely lineolate and with a few scattered punctures, surrounded by a salient rim, faint above medially but distinct at upper lateral angles; wings yellowish, darkened apically; nervures and stigma honey-color, subcosta dark; second submarginal broad; third narrowed about one third to marginal; tegulæ dark, with a red center and a narrow light border; legs dark, apical joints of tarsi ferruginous, pubescence of legs ochraceous, becoming reddish on apical joints of tarsi; hind inner spur with about five long teeth; abdomen black, somewhat shiny, with sparse ochraceous pubescence at base and apex, and on apical margins 2–4 laterally and bases 2–3 laterally very faint white hair spots, that surrounding the anal rima reddish; abdomen finely transversely lineolate almost impunctate, under a high power showing a few scattered very fine punctures. Length about 8 mm.

Montreal Island, Quebec, May 21, 1904, received from C. F. Baker; also North Sangus, Mass. (J. C. Crawford coll.).

Halictus ligatus Say.

In the tables the various forms in which the females have the cheeks armed with a spine are not separated from this species, since they are very closely allied and an abundance of material is needed to work out their status. These forms are *armaticeps* Cresson, *capitosus* Smith, *texanus* Cresson, and *townsendi* Cockerell.

Class I, HEXAPODA.

Order II, COLEOPTERA.

NOTES ON LEPTINOTARSA UNDECIMLINEATA STÅL.

By FREDERICK KNAB.

WASHINGTON, D. C.

The chrysomelid beetle *Leptinotarsa undecimlineata* Stål was found by the writer in great abundance on the 17th of June, 1905, at Carmen and at other points in the state of Vera Cruz, Mexico, along the railroad running southeastward from Cordoba to Santa Lucrecia on the Isthmus of Tehuantepec. The insects were feeding upon *Solanum torvum* L., and had evidently been stimulated to sexual activity by the first rains of the wet season. Many pairs were found in copula and one cluster of eggs was found, placed on the underside of a leaf as in our *L. decemlineata*. These eggs of *L. undecimlineata* are of an extremely pale yellow, in remarkable contrast with the deep golden yellow, almost orange color of the eggs of *L. decemlineata*. There were no larvæ at this time.

The females are remarkable in the enormously distended abdomen, a condition supposedly peculiar and characteristic in certain genera of Chrysomelidæ. In these females of *L. undecimlineata* the abdomen is swollen to such a degree that it is not only exposed at the sides and between the widely divergent elytra, but a large portion of it protrudes beyond the tips of the elytra. The fourth and succeeding segments project beyond the elytra in a specimen preserved in fluid, taken by Mr. B. Jordan in Alta Vera Paz, Guatemala. On the exposed abdomen the dorsal plates appear as narrow black transverse strips upon the broad white area of the expanded connecting tissue. This condition of the female is even indicated in dried specimens where the elytra have come together over the shrunken abdomen; the sutural margins of the elytra show a slight divergence towards the tip. In the genus *Gastroidea*, noted for the greatly swollen abdomen of the fertile female, there is a modification of the abdominal integument. In some females of *G. cyanea* examined by the writer the entire integument of the abdomen is uniformly pigmented and apparently of the same texture throughout.

The coloration of *Leptinotarsa undecimlineata* is noteworthy. While dried specimens differ but little in this respect from *L. decemlineata*, the ground color of the elytra and thorax of the live specimens is a peculiar very pale greenish gray, and this in the breeding season when the colors should be at their fullest and no immature individuals present.

Dr. E. Dugès has given a detailed description, accompanied by figures, of the early stages of this beetle.* He describes the larva as white in color with black markings. The markings are very different from those of our *L. decemlineata* and the species related to it. The head, legs and prothoracic shield are black. The meso- and metathorax bear small black lunar marks at the sides. Segments 1–6 of the abdomen have heavy black lunar marks at the sides which involve the stigmata; on segments 1–5 the ends of the opposing lunules are connected by slender, more or less broken, dorsal lines. Segments 6, 7 and 8 bear quadrate black dorsal areas. These markings vary greatly in amount and all intergrades occur to a form in which only round black stigmatal spots are present. This is the form figured by W. L. Tower.† The pupa is white with only the stigmata black.

The food plant is large and spiny with coarsely hairy leaves. Dr. Dugès gives its name as *Solanum tardum* but as no species of that name is known the above mentioned *Solanum torvum* is doubtless intended.

Dugès has found many of the larvæ, particularly the young ones, more or less covered with the hairs from the leaves of the food-plant. As these hairs are attached very irregularly and are absent in many larvæ he assumes they adhere accidentally during the movements of the larva in feeding and are not adopted as a defensive covering. Tower describes this condition in the following words: "As the small larvæ push about through the abundant trichomes on the leaves of their food plants, a large accumulation of these become lodged among and cemented to the spines by the secretion of the dermal glands, until the larva presents the color and appearance of a ball of dislodged trichomes. . . . The integument in this second stage is smooth and entirely devoid of spines on the tergal and sternal elements of the segments. Owing to the sticky secretion of the dermal glands a deposit of trichomes gathers on the larva in this stage, though, owing to the absence of spines, this deposit is thinner than in the previous stage. . . . In the final stage the increase in the body surface, which is not accompanied by any great increase in the number of dermal glands, results in there being on the body only a very slight deposit of trichomes, if any at all, so that the larvæ are freely exposed on the leaves of their food-plant." *

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* Ann. Soc. Ent. Belg., Vol. XXVIII, pp. 1–6, Pl. I, 1884; Spanish translation: La Naturaleza, Vol. VII, pp. 308–311, Pl. VIII, 1887.

† An investigation of evolution in chrysomelid beetles of the genus *Leptinotarsa*, 1907, pl. 17, figs. 1, 2 and 3.

But by far the most remarkable detail of the account of Dugès relates to the eggs. These are stated to be stalked and laid in groups of 100–150. These eggs are disposed in two layers or stories, those of the upper story being elevated above the others by slender stalks. The group consists first of a row of eggs attached at one extremity by a sort of foot and in contact with each other. This is followed by a second row, parallel to the first, but these eggs are upon slender stalks which raise them above the lower layer. This row is followed by a third one of low-stalked eggs and this by a fourth row of long-stalked ones. The arrangement is somewhat irregular and the long-stalked eggs are less numerous than the others. As far as I am aware no case of eggs upon stalks has ever been recorded for the Chrysomelini by other observers. In the entire group of Chrysomelidæ, with the exception of this single case, stalked eggs are known only from the Clytrini. Nevertheless it can hardly be assumed that Dugès was in error, as in other respects his description of the eggs answers very well for this group and he evidently bred the species from these eggs.

Leptinotarsa undecimlineata is credited to the fauna of the United States on the strength of an old record for southern California which is erroneous beyond a doubt. Mr. G. Beyer, who collected thoroughly in Lower California, writes me that he did not meet this species there. Dr. Dugès' records for the states of Michoacan and Guanajuato probably indicate the northernmost range of this species.

The record of this species from Matamoros in Tamaulipas, near Brownsville, Texas, by C. H. T. Townsend † is based upon an erroneous determination. The specimens are described in detail by Townsend and are unquestionably the species recently characterized by Mr. Chas. Schaeffer as *Leptinotarsa texana.* ‡

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* *L. c.*, p. 146.

† Trans. Tex. Acad. Sci., Vol. V, pp. 82–84, 1903.

‡ Science Bulletin, Brooklyn Inst. Arts & Sci., Vol. I, p. 239, 1906.

The larva of *L. texana* is carefully described by Townsend and differs from that of our common *L. decemlineata* by its pale straw color and by the absence of the series of baso-pleural spots of the abdomen. In this latter character it approaches the larva of *L. juncta*.

Leptinotarsa texana has generally passed among American entomologists under the name *defecta*. Mr. Schaeffer, who took both species at Brownsville, has demonstrated the distinctness of the two forms. Tower has recently added to the confusion by treating *texana* under the name *defecta* and quoting the localities given by Stål and Sallé for the true *defecta*. The following references may help to clear the confusion.

Leptinotarsa defecta Stål.

Myocoryna defecta Stål, Öfv. af K. Vet. Ak. Förh., 1859, p. 317.
Chrysomela defecta Stål, Mon. Chrys. de l'amérique, 1862, p. 165.
Leptinotarsa defecta Jacoby, Biol. Centr. Amer., Phytophaga, I, p. 234, Pl. XIII, fig. 21, 1892.
Leptinotarsa defecta Schaeffer, Bull. Brookl. Inst. Arts and Sci., I, p. 239, 1906.

Leptinotarsa texana Schaeffer.

Leptinotarsa defecta Linell, Jour. N. Y. Ent. Soc., IV, p. 196, 1896.
Leptinotarsa 11-lineata Townsend, Trans. Tex. Acad. Sci., V, pp. 82–84, 1903.
Leptinotarsa defecta Tower, Evolut. in Leptinotarsa, pl. 23, fig. 20, 1906.
Leptinotarsa texana Schaeffer, Sci. Bull., Brookl. Inst. Arts and Sci., I, p. 239, 1906.

BIOLOGICAL NOTES ON MEGILLA MACULATA DE GEER.

By A. Arsène Girault,

New Richmond, Ohio.

The following brief descriptive and biological notes on this ladybird were obtained while making an attempt to keep many pairs in confinement through the several generations of a season, but which attempt failed because of the scarcity of food. There is included a description of the process of hatching, records of the period of incubation during portions of May and June, 1907, records of the larval and pupal instars for a single generation, and notes on adults kept in confinement, all of which are more or less fragmentary. The observations were made in the laboratory at New Richmond, Ohio, about latitude 38 degrees, 48 minutes north.

HATCHING.

Just previous to hatching, the eggs are dusky yellow, due to the inclosed embryo. The eggs in a mass turn this color almost simultaneously, about from eight to twelve hours before hatching. Through a lens the body of the fully-developed embryo is distinctly visible, and its distinct segmentation gives the egg a dark-ringed appearance, throughout its length. The embryo is erect, the setæ more or less visible as short irregular streaks of black, but the disposition of the legs is not distinct. The basal one-third of the egg is darker. The ocellar spots of the embryo are visible as a small group of three minute dots in a triangle on the latero-cephalic aspect (*i. e.*, on each side of the anterior end), and the tips of the mandibles between these two groups as two fainter red dots on the ventro-cephalic aspect of the egg. The two black papillar spots on the pronotum are also distinct, and the median line of the two posterior segments of the thorax. Just previous to eclosion, the egg is somewhat swollen at its cephalic end.

The egg-shell parts along the dorsal aspect from the apex down to about half its length, and the head of the larva at once appears. The body is gradually worked out until the legs are free, when the larva, holding itself erect by means of the unexcluded terminal segments, exercises the legs back and forth until they are strong and dry. At first, the legs are disposed along the ventum. The act of hatching varies in time, averaging from about 50 to 70 minutes. The larva then frees itself from the egg and rests upon the mass. It is then normal for instar I, excepting for the pale yellow color of the legs, ventum and the head and its appendages, which form a decided contrast to the dusky color of the dorsum.

The egg-shells are not eaten. Forty-six young larvæ, hatching during the first week of June, 1907, and starved in confinement, lived on an average of four and one half days, ranging from four to five days.

Each clutch of eggs was confined in darkness, under the cover of small paste-board boxes, and also in-doors, so that the period must be considered as not absolutely natural, though under the usual laboratory conditions. These conditions are stated in case it is shown in the future that the presence or absence of direct or indirect sunlight have the effect on the period of incubation of this insect attributed to them in regard to those of other animals. In nature, the eggs are seldom or never exposed to the direct rays of the sun, being under a leaf, but it is a question whether the conditions of their usual environment are obtained in the laboratory.

PERIOD OF INCUBATION.

TABLE I.

PERIOD OF INCUBATION, MAY 24–JUNE 10, 1907.

Lot No.	No. Eggs.	Deposited.	Hatched.	Length of Instar.		Average Effective Temp.
				Days.	Hours.	Degrees Fahr.
1	5	3 p. m., May 24.	7 p. m., May 30.	6	4	20.2°
2	26	8 p. m., May 24.	10 p. m., May 30.	6	2	19.9
3	16	2 p. m., May 26.	3 p. m., June 3.	8	1	19.5
4	15	3 p. m., May 26.	2:30 p. m., June 3.	7	23½	19.5
5	34	1:30 p. m., June 1.	9 p. m., June 8.	7	7½	20.1
6	14	3 p. m. June 4.	2 p. m., June 10.	5	23	22.0
Totals.	110				997	121.2
Averages.				6.92		20.2

Duration of Postembryonic Instars.

In Table II the duration of the different stages after hatching are shown for a single generation, from May 25 to June 23. The larvæ were fed on various aphids which were supplied them in abundance, and they were confined separately under the conditions stated in regard to the eggs, as were also the pupæ.

The sums of effective temperature for the different individuals of this generation vary for over seventy degrees, when it appears that they should be very nearly alike, other conditions being equal. It would seem as if equal amounts of effective temperature should cause equal amounts of growth or development in individuals of the same age, providing food and other factors of environment are equal, but apparently there are also internal factors involved, causing certain individuals to deviate in either direction from the average. The individual instars vary considerably from a little less than two days to a little more than nine days, but this larger variation in the duration of separate instars or stages does not affect the length of the entire life-cycle, one stage generally making up what the other loses.

ADULTS IN CONFINEMENT.

A pair of mating adults captured on the foliage of blackberry at 11 A. M., May 24 and confined, produced but 17 eggs, the female dying on June 8. These eggs were deposited on May 24 (5) and

TABLE II.

POSTEMBRYONIC INSTARS FOR A SINGLE GENERATION, MAY 25–JUNE 23.
Hatched 10:15 A. M., May 25.

[illegible]	First Ecdysis. Instar I.	Second Ecdysis. Instar II.	Third Ecdysis. Instar III.	Pupation. Instar IV.	Emergence. Pupal Instar.	Sums.	Sums. Effective Temp Degrees Fahrenheit.
1	11 a. m., May 31. 6 days, ¼ hr.	7 p. m., June 4. 4 days, 8 hrs.	8 p. m., June 9. 5 days, 1 hr.	6 a. m., June 17. 7 days, 10 hrs.	4 p. m., June 21. 4 days, 10 hrs.	27–5¾	682.4
2	Noon, June 3. 9 days, 1¼ hrs.	6 a. m., June 5. 1 day, 18 hrs.	7 p. m., June 11. 6 days, 13 hrs.	1 p. m., June 19. 7 days, 18 hrs.	5 a. m., June 23. 3 days, 16 hrs.	28–18¾	718.4
3	1 p. m., May 31. 6 days, 2¼ hrs.	7 a. m., June 6. 5 days, 18 hrs.	7 p. m., June 9. 3 days, 12 hrs.	7 p. m., June 17. 8 days.	5 a. m., June 22. 4 days, 10 hrs.	27–18¾	682.4
4	2 p. m., May 31. 6 days, 3¼ hrs.	6 a. m., June 5. 4 days, 16 hrs.	10 a. m., June 11. 6 days, 4 hrs.	3 p. m., June 18. 7 days, 5 hrs.	7 a. m., June 22. 3 days, 16 hrs.	27–20¾	682.4
5	3 p. m., May 31. 6 days, 4¼ hrs.	a					
6	1 p. m., May 31. 6 days, 2¼ hrs.	6 a. m., June 4. 3 days, 17 hrs.	9 p. m., June 9. 5 days, 15 hrs.	5 p. m., June 16. 6 days, 20 hrs.	6 a. m., June 21. 4 days, 13 hrs.	26–19¾	647.9
7	5 a. m., June 1. 6 days, 18¼ hrs.	Noon, June 6. 5 days. 7 hrs.	4 p. m., June 11. 5 days, 4 hrs.	5 p. m., June 19. 8 days, 1 hr.	6 a. m., June 23. 3 days, 13 hrs.	28–19¾	718.4
8	10 a. m., 31 May.[b] 5 days, 23¼ hrs.						
Av.	6.58 days.	4.25 days.	5.34 days.	7.54 days.	4.04 days.	27.9 days.	688.65

[a] Died June 11. [b] Died during ecdysis.

26 (12) in the middle of the afternoon. A female captured on May 24, 11:30 A. M., and confined in the laboratory, and another one mating with a male, captured at 5 P. M., May 26, and similarly confined deposited eggs as follows:

Female No. 1 (Male Present).		Female No. 2 (Male Present).	
Date of Oviposition.	No. of Eggs.	Date of Oviposition.	No. of Eggs.
6 P. M., May 24	15	P. M., June 1	19
2 " 26	16	" 5	11
1:30 " June 1	26	" 8	18
4 " 4	10	" 9	12
June 7	15	10 A. M., 10	16
P. M., 9	14	11	20
11	16	16	6
	Total 112	19	1
			Total 103

Female No. 1 died at about noon, June 21. The second pair died on June 22; they were observed mating on May 30, June 4, 5, 9, 10 and 12.

The eight adults emerging June 21–23 (Table II) were confined together in a large glass jar and supplied abundantly with food. They did not begin to mate until June 28, when one pair was observed; another pair was observed mating on July 5, and both of them were isolated. The first pair produced 37 eggs and then escaped on July 8. They mated again on July 2 and 7. The second pair produced no eggs and died for lack of food about July 12. They had mated a second time on July 6.

Class I, HEXAPODA.

Order IV, DIPTERA.

DESCRIPTIONS OF NEW MOSQUITOES FROM THE PANAMA CANAL ZONE.

By Harrison G. Dyar and Frederick Knab,
Washington, D. C.

Our knowledge of the mosquito fauna of the Isthmus of Panama has heretofore amounted to practically nothing, but thanks to the collections recently made by Mr. August Busck, is now decidedly improved. Mr. Busck went to the Isthmus at the invitation of Dr. W.

C. Gorgas of the Isthmian Canal Commission and through the courtesy of the Department of Agriculture especially to investigate the mosquitoes of that region. We are especially indebted to Dr. Herman Canfield of the Department of Sanitation of the Canal Zone, through whose initiative and interest the present investigation has resulted. A full list of the species collected will be made by Mr. Busck. Only the new ones are referred to here.

Anopheles gorgasi, new species.

Palpi as long as the proboscis, mostly black scaled, the terminal and penultimate joints light scaled except at the bases and apices; mesothorax gray, with fine brown scales, a black spot in front of the scutellum, a pair of sublateral black spots medially; wings with the veins scaled in black and white, two very large black patches on the costa and a smaller one towards the base and a smaller one at the apex as in *A. albimanus* Wied. The rest of the wing is too much denuded to describe. Abdomen with groups of outstanding scales laterally at the apices of the segments, the dorsum clothed with yellow scales on a dark ground, the lateral tufts black. Legs mostly black-scaled, hind legs with the apical half of the second, the third, and the base of the fourth joints white scaled, the remainder of the fourth and basal half of the fifth segments black, the third joint with a large black patch on the under side which reaches from near the base to beyond the middle. Length, 3.5 mm.

One female, in poor condition, La Boca, Canal Zone, Panama (A. H. Jennings, collector).

Type. — No. 10863, U. S. National Museum.

Named, at the suggestion of Mr. August Busck, in honor of Dr. W. C. Gorgas, Assistant Surgeon-General, U. S. Army, Chief Sanitary Officer of the Isthmian Canal Commission.

Anopheles malefactor, new species.

♀. — Palpi long, clothed with brown scales and black outstanding ones, which are grouped more or less in tufts, heaviest on the basal portion, a slight sprinkling of lighter scales among the brown ones, particularly at the bases of the dark tufts; occiput black scaled, the eyes margined with white above and where they join is a tuft of white hairs; mesonotum gray with reddish and bluish tinge and small dark freckles tending to form longitudinal rows, sparsely distributed narrow yellowish scales, a black spot at the base extending over the middle of the scutellum and two small sublateral black spots medially, all three of these show a lighter margin; abdomen slender, gray, with lateral tufts of outstanding black scales at the apices of the segments; legs with the femora and tibiæ black freckled with white, on the hind tibiæ yellow scales predominate; tarsi black, ringed with yellowish white; on the hind legs the first tarsal joint is dark at the base, light at the apex and has six white rings of different lengths, second joint narrowly white at base, broadly so at apex, with a moderately broad white ring near the middle and another narrower one between it and the base, third and fourth joints white ringed at base and apex with a broad central white ring, apical segment entirely whitish scaled; wing spotted, black and white, a large black patch margined with white on the costa near the middle, more basally a smaller costal patch and towards the apex another large one, all margined with white, scaling of the veins in patches of black and white scales, the third vein with a small black spot at the base, the sixth vein with many black dots and dashes. Length, 4.5 mm.

♂. — Palpi with the apical portion clubbed, clothed with yellow scales with golden luster, a narrow dark ring at the middle of the club, the shaft ringed with dull ochreous at the apex and at the constriction and broadly marked with the same color on the apical portion; antennæ pale brown and ferruginous with silky luster. Length, 4.5 mm.

Seven specimens, Chagres River, Panama (August Busck, collector); Tabernilla, Canal Zone, Panama (August Busck, collector); Gatun, Canal Zone, Panama (A. H. Jennings, collector).

Type. — No. 10877, U. S. National Museum.

There is some variation in the banding of the hind tarsi. In two specimens the penultimate and apical white rings of the second joint are united; in one the apical white ring of the first joint is divided by a black bar, in another the penultimate ring is so divided, while in a third, the apical, penultimate, antepenultimate and another white ring are so divided, this specimen having eleven white rings on this joint instead of seven as in the type.

Mansonia phyllozoa, new species.

♂. — Proboscis moderately long and stout, slightly swollen towards the apex, black scaled, a yellow-white ring behind the middle; palpi nearly as long as the proboscis, black scaled with two yellow-white rings, the apices brilliantly silver scaled; mesonotum very deep brown with four longitudinal lines of silvery-white scales, two of these lines are marginal and extend the entire length of the mesonotum, the other two submedian and begin behind the middle and extend over the scutellum where they unite upon its hind margin; the lateral stripes extend along the sides of the scutellum; metanotum with a median carina, dark brown. Abdomen dark scaled with lateral patches of whitish scales. Legs with the femora predominatingly yellow scaled, the apices black; tibiæ yellowish-white scaled, ringed with black, the rings becoming larger towards the apices, first tarsal joints black, maculate with white; on the hind legs the apices broadly white, the second tarsal joint white at the apex and nearly half its base, the third joint broadly white at the base, minutely at the apex, the fourth more narrowly white at the base, the fifth entirely white-scaled; fore and mid legs narrowly white marked. Wings with the veins mostly black scaled; four conspicuous yellowish-white elongated costal spots one of these basal and very long, the others shorter, all involving the first vein. Length, 3 mm.

One specimen, Tabernilla, Canal Zone, Panama (August Busck, collector), bred from larvæ in the leaves of Bromelias.

Type. — No. 10864, U. S. National Museum.

Deinocerites melanophylum, new variety.

A local race of *Deinocerites cancer* Theobald, differing by its very dark, almost black color; the clypeus and tori, which in the type form are yellow or yellowish brown, are here dark brown; the mesonotum is pitchy brown, the scales black with brownish luster, the metanotum is pitchy brown, nearly black; the abdomen is black-scaled above and beneath; in the male with blue and green iridescence. The legs are black.

Nine specimens, Colon, Canal Zone, Panama (August Busck, collector), from larvæ in crab-holes near the ocean.

Type. — No. 10865, U. S. National Museum.

Uranotænia calosomata, new species.

Proboscis moderately long and slender, slightly enlarged apically; clypeus and tori dull brown; occiput brown scaled with two oblique lines of white scales, which converge upon the vertex and terminate in a white tuft; thorax deep brown, on the lateral margin a line of white scales to the base of the wing; pleura brown with a longitudinal stripe of white scales extending forward over the prothoracic lobe and joining the stripe on the head; metanotum brown. Abdomen black scaled at the sides, above clothed with ochreous yellow dull metallic scales, leaving a narrow black line at the base of each segment, becoming broader on the terminal segments, and a subbasal median black spot; beneath with black vestiture and apical white bands, which are broadest on the centers of the segments. Legs black with bronzy and brassy luster, the apices of the femora white; on the hind legs the dilated apices of the tibiæ have a patch of white scales; hind tarsi with the third, fourth and fifth joints white with metallic luster. Wings heavily dark-brown scaled on the costa, the basal third of the first vein white scaled, the two forked cells small but broad, the second posterior cell slightly longer than the second marginal cell. Length, 2.5 mm.

Five specimens, Tabernilla, Canal Zone, Panama (August Busck, collector), bred from larvæ in prints of horses' feet containing water.

Type. — No. 10866, U. S. National Museum.

Uranotænia typhlosomata, new species.

♂. — Proboscis long and slender, much swollen at the apex, black scaled; antennæ amply plumose; palpi very short, black scaled; occiput black scaled, the margins of the eyes broadly bluish-white scaled; mesonotum brown, with minute dark-brown scales; scutellum with metallic-blue scales, the setæ long, black; in front of the roots of the wings is a short stripe of silvery-blue scales and a similar blue stripe extending over the anterior half of the pleura and over the prothoracic lobes; metanotum dark brown; abdomen depressed, black scaled above and at the sides; legs black with bronzy luster, the knees with a minute silvery spot and at the apices of the hind tibiæ another; on the hind tarsi the apical three fifths of the third and all of the fourth and fifth joints silvery white; wings black scaled along the costa, brown scaled on the veins, the base of the first vein with a patch of silvery scales, the fifth vein with a line of silvery scales close to the base. Length, 2 mm.

One specimen, Taboga Island, Panama (A. H. Jennings, collector), bred from larvæ from pool in a small stream.

Type. — No. 10918, U. S. National Museum.

In the single specimen the thorax is somewhat denuded and it is possible that there may be a blue spot before the antescutellar space.

Aëdes lithœcetor, new species.

♀. — Proboscis moderately long, rather slender, black scaled; palpi short, black scaled; occiput clothed with pale-yellowish scales, narrow curved ones on the vertex, flat ones on the sides, a small black patch on the lower part of the side; mesonotum with the anterior two-thirds clothed with shining light-yellow scales, a dark patch in front of the sides, posterior portion varied with blackish and pale-yellow scales, a patch at the side separated by a yellow stripe running from the middle to the base of the wing; scutellum yellow scaled; pleura dark with patches of white scales; mesonotum deep brown, nude; abdomen black-scaled above with median basal elongate creamy spots on all the segments, which however do not unite to form a stripe, segments with lateral triangular basal white patches, beneath the abdomen is mostly creamy white with black apical lateral triangular marks; legs black, knees yellow scaled, tarsi with narrow yellowish-white basal rings, the ring at the base of the second tarsal of the hind legs slightly involves the apex of the first joint; fork-cells rather short, scales of the veins all dark; claws of front and mid legs toothed, of hind legs simple. Length, 5 mm.

♂. — Palpi slightly shorter than the proboscis, hairy on the apical portion, the two apical segments light ringed at their bases; abdomen with distinct basal white bands on the second to fourth segments, on the succeeding segments broken into three spots, the median spot becoming elongate on the sixth and seventh segments, lateral cilia abundant, pale. Length, 4 mm.

Five specimens, Chagres River, Panama (August Busck, collector), bred from larvæ in pot-holes along the river.

Type. — No. 10868, U. S. National Museum.

Apparently nearly allied to *Danielsia tripunctata* Theobald and to *Danielsia mediomaculata* Theobald, the abdominal marking differing from the former and the thoracic marking differing from the latter. We would place *Danielsia* Theobald as a synonym of *Aëdes* in our classification.

Culex jubilator, new species.

♀. — Proboscis rather long and slender, not swollen towards the apex, clothed with black scales, not ringed; palpi short, black scaled; occiput clothed with narrow yellowish scales, margin of the eyes narrowly white, the upright forked scales brown with yellow luster; mesonotum light brown with golden luster; pleura pale gray; abdomen subcylindrical, truncate at apex, black scaled above with faint bronzy luster, segments 2 to 7 with a median basal triangular spot of white scales, the spots on the posterior segments smaller, eighth segment with a white basal band, which is laterally enlarged, a row of white lateral spots, ventral area white scaled; legs black with bronzy luster, the tarsi with very narrow yellowish-white rings at both ends of the joints, last joint of hind tarsi narrowly whitish tipped; claws simple; scales of the wing-veins brown, long and narrow. Length, 3 mm.

♂. — Palpi considerably longer than the proboscis, the apical half with numerous long brown hairs, wholly brown scaled, without rings; antennæ strongly plumose; abdomen slender, depressed, dark-scaled above with faint bronzy luster, the segments with silvery-white basal bands which are produced triangularly in the middle, eighth segment entirely white scaled. Length, 3.5 mm.

Sixteen specimens, Taboga Island, Panama (A. H. Jennings, collector), bred from larvæ in water in old tubs in a pasture near the bathing beach.

Type. — No. 10916, U. S. National Museum.

The larva is very close to that of *Culex carmodyæ* Dyar & Knab, but has the pecten of the air-tube longer.

Culex revelator, new species.

♀. — Proboscis rather long and slender, not swollen at apex, brown scaled, not ringed; palpi short, black scaled; occiput brown scaled, ocular margin white; metanotum golden-brown scaled, pleura pale greenish gray; abdomen subdepressed, truncate at the tip, clothed above with black scales with bronzy and blue luster, the second and third segments with a median, basal, small patch of white scales, the succeeding segments banded, the bands broadest at middle, much narrowed at the sides, on the banded segments the bands are broadened laterally towards the ventral area; beneath entirely white scaled; legs dark with bronzy luster, the tarsi narrowly ringed with yellow-white at both ends of the joints; the tip of the last joint of the hind tarsi white; claws simple; wing scales brown, long and narrow. Length, 3 mm.

♂. — Palpi considerably longer than the proboscis, brown scaled with bronzy and bluish luster, the apical half with numerous long blackish hairs; antennæ amply plumose; abdomen long and slender, the segments with moderately broad basal silvery-white bands, those on the sixth and seventh segments dilated at the sides. Lateral cilia long, moderately abundant, pale brown. Length, 3.5 mm.

Four specimens, Taboga Island, Panama (A. H. Jennings, collector), bred from larvæ found in a boat containing water.

Type. — No. 10917, U. S. National Museum.

The larva is allied to *Culex proclamator* D. & K. and *C. inquisitor* D. & K., but differs from both in having the basal tuft of the tube well within the pecten.

Culex leprincei, new species.

♀. — Proboscis moderately long and slender, enlarged towards the apex, entirely black scaled; palpi short, black scaled; occiput clothed with flat bronzy scales and with black erect forked ones, without white ocular margin; mesonotum clothed with deep bronzy brown scales with faint indications of two lighter longitudinal dorsal lines; scutellum bronzy scaled; metanotum deep pitchy brown; abdomen broad, flattened, truncate at tip, black scaled above with faint bronzy luster, the bases of the segments with lateral white triangular spots, the marginal hairs light yellow, beneath the segments are black with broad white basal bands; legs dark with bronzy luster, the knees and tips of tibiæ lighter colored, tarsi not ringed, claws simple; wing scales brown. Length, 3.5 mm.

♂.—Palpi about one-fourth longer than the proboscis, the two last segments very hairy, clothed entirely with deep brown scales with bronzy luster; antennæ densely plumose; lateral spots of the abdomen large on segments 5, 6 and 7, the lateral cilia coarse, moderately abundant with yellowish luster. Length, 3 mm.

Sixteen specimens, Tabernilla and Pedro Miguel, Canal Zone, Panama (August Busck, collector), bred from larvæ in a stagnant ill-smelling pool and among grass in the edge of a slowly running stream.

Type.—No. 10869, U. S. National Museum.

Named, at the suggestion of Mr. Busck, in honor of Dr. J. A. LePrince, Chief Sanitary Inspector of the Canal Zone.

Culex corrigani, new species.

♀.—Proboscis long and slender, distinctly swollen at the apex, black scaled, not ringed; palpi very short, brown scaled; occiput brown scaled, the eyes with distinct white margins; mesonotum rather light-brown scaled, with a darker shade on the posterior portion and with many long coarse black bristles; metanotum very light brown; pleura pale greenish; abdomen somewhat depressed, truncate at the tip, clothed above and at the sides with black scales with a brownish luster, beneath greenish-white scaled along the median line; legs black with bronzy luster, claws simple; scales of the wing-veins brown, long and narrow. Length. 3 mm.

One specimen, Tabernilla, Canal Zone, Panama (August Busck, collector), bred from larvæ in water in bamboo joints.

Type.—No. 10870, U. S. National Museum.

Named, at the suggestion of Mr. Busck, in honor of Mr. John Corrigan, Sanitary Inspector of Tabernilla.

The larva is allied to that of *Culex conservator* Dyar & Knab, but differs in the long slender antennæ on which the tuft is placed very near the apex, and in having six single hairs on the air-tube.

Culex equivocator, new species.

♀.—Proboscis rather long and slender, very slightly enlarged towards the apex, black scaled; palpi short, black scaled; occiput brown scaled with bronzy luster, the ocular margin very narrowly white scaled; mesonotum uniformly rich brown scaled with bronzy luster; metanotum light brownish; abdomen depressed, truncate at the tip, clothed above with brownish-black scales with faint bluish luster, the segments with lateral white triangular basal spots, most distinct on segments 5, 6 and 7, beneath black, the bases of the segments with broad soiled white bands; legs dark with bronzy luster; claws equal and simple; scales of the wing-veins brown, long and narrow throughout. Length, 3.5 mm.

♂. — Palpi longer than the proboscis, the two terminal segments with long hairs, entirely clothed with deep-brown scales, without pale rings; abdomen with narrow white basal segmental bands above, the eighth segment entirely white scaled. Length, 3.5 mm.

Eight specimens, Tabernilla, Canal Zone, Panama (August Busck, collector), bred from larvæ in water in bamboo joints.

Type. — No. 10873, U. S. National Museum.

Allied to *C. hesitator* D. & K., described below, but differing in the shape of the wing-scales.

Culex jenningsi, new species.

♀. — Proboscis moderately long and slender, not swollen towards the apex, clothed with black scales, not ringed; palpi short, black scaled; occiput clothed with dark scales and lighter ones intermixed, margin of the eyes white scaled; mesonotum clothed with dark-brown scales with bronzy luster with several faintly indicated longitudinal ridges; metanotum dull brown; abdomen depressed, truncate at the tip, clothed with black scales which show a bronzy luster in some lights, the second, third and fourth segments have white basal bands, on the succeeding segments these are represented only by triangular lateral spots, a dark-blue metallic reflection at the tip of each segment, beneath the abdomen is dark scaled with distinct white basal bands; legs black with bronzy luster, the knees and apices of the tibiæ on the hind legs silvery white, hind tarsi narrowly ringed with silvery white at the bases; pleura pale greenish with two blackish longitudinal stripes; claws simple; veins of the wings brown scaled, the scales long and narrow. Length, 3 mm.

♂. — Palpi long and very slender, slightly longer than the proboscis, the apices blunt, black scaled without white rings; antennæ densely plumose; abdomen with narrow silvery-white basal bands on all the segments. Length, 3 mm.

Four specimens, Tabernilla, Canal Zone, Panama (August Busck, collector), bred from larvæ in water in the leaves of Bromelias.

Type. — No. 10867, U. S. National Museum.

Allied to *Culex consolator* Dyar & Knab.

Named, at the suggestion of Mr. Busck, in honor of Mr. A. H. Jennings, Special Sanitary Inspector of the Canal Zone.

Culex gaudeator, new variety.

♀. — Proboscis moderately long and slender, enlarged at the apex; palpi short, black scaled; occiput clothed with flat silver-gray scales and with numerous upright forked ones, mesonotum deep-brown scaled, on the anterior half a broad marginal yellowish stripe which curves inward at the middle; the posterior end of the stripe may form a detached dot or the whole marking may be absent; antescutellar bare space surrounded by light-colored scales, the light markings show a brassy or silvery luster in changing lights; scutellum silvery scaled; pleura light brown with patches of white scales; metanotum deep pitchy brown; abdomen depressed, truncate at apex, clothed above with black scales, at the sides with distinct basal triangular white patches, beneath black with broad white basal segmental bands; legs dark with bronzy luster, the knees capped with silvery, hind tibiæ with a large silvery spot at the apex, tarsi narrowly ringed with silvery white at the bases of the joints, the last joint of the hind tarsi dark on the apical two thirds; claws simple; scales of the wing-veins brown. Length, 3 mm.

♂. — Palpi long and very slender, nearly as long as the proboscis, black scaled without white rings; abdomen dark scaled with distinct bronzy luster and with narrow basal segmentary white bands, which become dilated at the sides, beneath uniformly silvery white, except the extreme apex. Length, 2.5 mm.

Seven specimens, Tabernilla, Canal Zone, Panama (August Busck, collector), bred from larvæ in water in the leaves of Bromelias.

Type. — No. 10871, U. S. National Museum.

Nearly allied to *Culex imitator* Theobald, but the thoracic markings less silvery and the tarsal bandings narrower.

We describe this form as a variety of *Culex jenningsi* Dyar & Knab, in which the thorax is ornamented. The basal abdominal bands of *jenningsi* are lost in this form, but may be seen under the microscope as 3 or 4 scales at the bases of the segments. The white rings on the tarsi are of a different width.

The larva is closely similar to that of *Culex rejector* Dyar & Knab, unbred, found in Bromelias at Cordoba, Mexico. It is possible that the species is the same, but we await the receipt of adults from Mexico before a final decision.

Culex hesitator, new species.

♀. — Proboscis moderately long, very slightly broadened towards apex, black scaled; palpi short, black; occiput clothed with recumbent whitish scales and with erect black forked ones; mesonotum uniformly rich brown with slight bronzy luster; pleura very pale brownish with an indistinct dark longitudinal shade; metanotum pale grayish brown; abdomen depressed, truncate at the tip, black scaled above with coppery and greenish luster, marginal hairs of the segments pale yellow, lateral white basal spots present, those on the terminal segments largest, venter black, with distinct white basal bands; legs dark with bronzy luster; wing-veins uniformly brown scaled; claws simple. Length, 3 mm.

♂. — Palpi much longer than the proboscis, the last two segments projecting beyond it, brown scaled, not ringed; antennæ densely plumose; abdomen with basal silvery-white bands above, broadest on the fourth and fifth segments and much prolonged on the sides on the sixth and seventh segments. Length, 3.5 mm.

Seven specimens, Las Cacadas, Canal Zone, Panama (August Busck, collector), bred from pupæ captured in a small swampy stream.

Type. — No. 10872, U. S. National Museum.

Allied to *Culex extricator* Dyar and Knab, but the banding of the abdomen beneath differs.

Joblotia trichorryes, new species.

♀. — Form elongate-slender, the abdomen compressed; proboscis shorter than the body, rather stout, and slightly enlarged towards the apex. Clypeus prominent, luteous brown, with a row of fine hairs along each side, none in front nor on the upper surface. Palpi short, rather slender, about one fourth the length of the proboscis; tori yellow-brown; antennæ with whorls of long hairs; occiput clothed with flat irridescent blue and green scales, brilliant silvery in some lights; hind margin with a row of erect dark scales; prothoracic lobes large and prominent, well separated, clothed with brilliant silvery scales; mesothorax somewhat compressed, clothed with dusky scales, pleura ochreous yellow, with patches of silvery scales; scutellum clothed with broad flat metallic blue-green scales; metanotum with three longitudinal impressions, a group of coarse terminal hairs; abdomen obliquely truncate at the tip, clothed above with dusky scales, which show metallic-green and steel-blue reflections; beneath silvery white, encroaching on the lateral area as rounded segmentary incisions. Wings long and narrow, hyaline, the scales of the veins dusky. Legs long, slender, without raised scales, black, with metallic violet and blue reflections, the tarsi of the middle legs with the last four joints brilliant white, the hind legs with the outer half of the third and the last two joints white. Claws simple. Length, 5.5 mm.

♂. — Proboscis shorter than in the female, more distinctly swollen at the tip; palpi long, nearly as long as the proboscis, very slender; antennæ rather sparsely plumose; abdomen much compressed; claspers stout, rather small; no lateral fringe. Length, 5.5 mm.

Thirty-six specimens, Tabernilla, Canal Zone, Panama (August Busck, collector), bred from larvæ in bamboo joints. The larva resembles that of *Joblotia digitatus* Rondani, but has the mandibles long and slender. In some of the adults there is a little of black on the last joint of the middle legs.

Type. — No. 10847, U. S. National Museum.

Joblotia mogilasia, new species.

♀. — Form stouter than the preceding species; proboscis shorter than the body, gradually enlarged towards the apex. Clypeus brown, prominent, with a fringe of small hairs mixed with a few scale-like hairs at the sides, nude on the upper surface. Palpi short and slender, about one fourth the length of the proboscis. Occiput clothed with flattened dusky scales with an obscure metallic blue and green luster; prothoracic lobes large and prominent, well separated and clothed with silvery scales, mesonotum dusky scaled, with an obscure bluish luster; pleura ochreous yellow, covered with silvery scales; scutellum covered with large, flat, broad, bright metallic blue-green scales; metanotum dusky brown with two longitudinal impressions and a group of coarse bristles near the apex; abdomen dusky above with metallic blue and green reflections, truncate at the tip, beneath yellowish white with an undulate margin at the sides; wings long and narrow, the scales of the veins dusky; legs long, moderately slender, without distinct raised scales, dark, with blue and violet luster, the hind tibiæ are white marked at the base; the last four joints of the middle tarsi are bright white, extreme tip black, on the hind tarsi the apical half of the third and the fourth and fifth joints white. Length, 6 mm.

Three specimens, Tabernilla, Canal Zone, Panama (August Busck, collector), bred from larvæ in bamboo joints. The larva resembles that of *Joblotia digitatus* Rondani (= *nivipes* Theob.).

Type. — No. 10848, U. S. National Museum.

Lesticocampa culicivora, new species.

♀. — Proboscis long and slender; palpi not as long as three joints of the antennæ, slender, black; clypeus black, shining, nude; occiput clothed with flat deep blue scales; prothoracic lobes large, prominent, well separated, with a few silvery scales; mesothorax compressed, covered with steel-blue scales; scutellum clothed with flat broad shining bright-blue scales; metanotum deep brown, a group of setæ towards the apex; abdomen long and slender, subcylindrical, the segments somewhat constricted beneath, above clothed with steel-blue scales, beneath with yellowish silvery ones with an undulate lateral margin; wings long and narrow, hyaline, the cross-veins nearly incident; legs long and slender, the hind legs with outstanding scales on the apical portion of the tibiæ and particularly on the second joint of the tarsi; forming a short lateral fringe; black with violet-blue reflection, the tarsi of the middle legs with the apical half of the second and the succeeding segments silvery white, of the hind legs with the last two joints white. Length, 5 mm.

One specimen, Tabernilla, Canal Zone, Panama (August Busck, collector), bred from larvæ in flowers of Heliconia, associated with some unbred long-tubed larvæ, probably a species of *Culex*.

Type. — No. 10849, U. S. National Museum.

Sabethes canfieldi, new species.

♀. — Proboscis shorter than the body, strongly swollen at the apex, black; clypeus prominent, smooth, shining black; tori of the antennæ black with a whitish pubescence; occiput clothed with flat dull metallic-green scales; prothoracic lobes approximated, clothed with brilliant blue and violet scales; mesonotum clothed with dark greenish scales; scales of the scutellum metallic green and blue; metanotum deep brown, with a number of long pale bristles; abdomen dark above, with greenish-blue luster, silvery white beneath, separated on the sides in a perfectly straight line; legs long and slender, without raised scales, black, with light bronzy reflections beneath in certain lights, the tarsi of the middle legs white on the second to fifth joints, the white becoming obscure on the basal part of the second segment, on the hind legs the last two joints white. Length, 3.5 mm.

Twenty-three specimens, Lion Hill, Canal Zone, Panama (August Busck, collector), all captured.

Type. — No. 10850, U. S. National Museum.

Named, at the suggestion of Mr. Busck, in honor of Dr. Herman Canfield, Assistant Chief Sanitary Inspector of the Canal Zone.

Sabethes identicus, new species.

♀. — Identical with *Sabethes undosus* Coq.; we are unable to demonstrate any differences whatever between the adults.

Four specimens, Tabernilla, Canal Zone, Panama (August Busck, collector), bred from larvæ in bamboo joints.

Type. — No. 10851, U. S. National Museum.

The larvæ are allied to those of *Sabethes undosus*, but differ in many particulars, so that a distinct species is indicated, in spite of the apparent identity of the adults. The air-tube is short, without any basal enlargement and but two pairs of single hairs; the body hairs are finer, less coarsely stellate; the dorsal hooks of the seventh segment with a tooth instead of simple; maxillæ less stout with seven small teeth instead of four large coarse ones.

Sabethes undosus Coquillett.

A large series of bred specimens was obtained by Mr. Busck from larvæ in bamboo joints, the larvæ agreeing with those figured by us under this name. The genus *Sabethinus* Lutz is apparently synonymous with *Sabethes*, and his species *Sabethinus aurescens* with *Sabethes undosus*. We are unable to determine at present which specific name has priority.

Sabethoides Theobald.

We suppressed this genus as a synonym of *Sabethes*, but it can be recognized therefrom by the long slender proboscis, not swollen at the tip. The prothoracic lobes are approximate, but not absolutely contiguous. Lutz and Theobald place this genus under the heading "palpi short in both sexes," but apparently neither of these authors has seen a male. We have a single male of *Sabethoides cyaneus* Fab. (= *confusus* Theob.) in which the palpi are nearly as long as the proboscis. (They are broken, but the end of the long joint reaches to the middle of the proboscis.)

Phoniomyia chrysomus, new species.

♂. — Proboscis long and slender, black; occiput dark scaled, a small silvery spot on the vertex; prothoracic lobes prominent, clothed with shining coppery scales; mesonotum and scutellum clothed with dark scales with faint greenish and bronzy luster, setæ of scutellum dark; metanotum deep brown with a group of setæ; abdomen black above with faint bluish sheen, beneath silvery white, the colors separated in a straight line; legs dark, with brassy reflection beneath, the mid legs with the third and fourth tarsal joints and the apex of the second silvery white at the side. Length, 2 5 mm.

One specimen, Tabernilla, Canal Zone, Panama (August Busck, collector), bred from larvæ in water in leaves of Bromelias.

Type. — No. 10854, U. S. National Museum.

Phoniomyia scotinomus, new species.

♂. — Proboscis long and slender, very slightly enlarged towards the apex, black; palpi very short; clypeus yellow-brown; occiput dark scaled, the vertex and dividing line of the eyes obscurely silvery; prothoracic lobes prominent, approximated, clothed with dark scales with a blue and violet luster; mesonotum clothed with dark-brown scales with slight bronzy luster, faintly greenish in certain lights; scales of the scutellum like those of the mesonotum; setæ of the scutellum dark; metanotum deep brown with a group of setæ towards the apex; abdomen black scaled above, with faint bluish luster, beneath lustrous whitish, the colors separated in a straight line on the sides, apex of the abdomen dilated; legs dark scaled above, beneath brassy, the middle legs silvery beneath on the third and fourth joints, hind legs silvery beneath on the last joint. Length, 3 mm.

♀. — Similar to the male.

Three specimens, Boqueron River, Panama, and Tabernilla, Canal Zone, Panama (August Busck, collector), bred from larvæ in water in the leaves of Bromelias.

Type. — No. 10855, U. S. National Museum.

Phoniomyia philophone, new species.

Proboscis long and slender, nearly as long as the body, very slightly enlarged towards the apex; clypeus prominent, pitchy brown, covered with fine gray pubescence; tori of the antennæ black with fine silvery pubescence; occiput behind the eyes broadly silver scaled; palpi very short, black; vertex with green and blue iridescent scales; antennal segments long, the whorls of hairs consist of a few long ones, and being well removed from each other do not give a densely plumose appearance; prothoracic lobes large, prominent, collar-like, closely approximate but not contiguous, clothed with violet and blue metallic scales and with many coarse bristles on the front margin; mesonotum rather short, stout, clothed with dark olivaceous and green scales; metanotum short, globose, with two longitudinal impressions, pitchy brown, a group of setæ beyond the middle; abdomen long and slender, compressed, clothed above with blackish scales with an obscure greenish luster, beneath with white scales, divided on the sides in a straight line; legs long and slender, dark brown with bronzy luster, a whitish reflection on the front tarsi. Length, 3 mm.

Twenty specimens, Tabernilla, Canal Zone, Panama (August Busck, collector), bred from larvæ in leaves of Bromelias.

Type. — No. 10852, U. S. National Museum.

Wyeomyia codiocampa, new species.

♀. — Proboscis rather short and stout, thickened towards the apex, black scaled; clypeus large, globose, brown with minute gray pubescence; palpi very short, black scaled; eyes divided by a narrow white-scaled strip; occiput clothed with brownish iridescent scales, the ocular margin narrowly white and forming a triangular patch between the eyes; prothoracic lobes large, prominent, well separated, the basal portion silvery white, tip also white, the central portion blackish brown; mesonotum short, convex, clothed with bronzy brown scales; setæ of the scutellum ferruginous yellow; metanotum pitchy black with a group of setæ towards the apex; abdomen rather stout, compressed, truncate at the tip with numerous terminal coarse bristles, black scaled above, creamy white beneath, the white forming deep lateral incisions at the apices of the segments; legs dark, with bronzy luster, the fore legs pale brassy beneath throughout their length, mid legs with the apical portion of the second, the third and fourth joints silvery white beneath, hind legs with the second and third joints silvery white beneath, the fourth and fifth bronzy brown. Length, 4 mm.

♂. — Antennæ shorter than in the female, the hairs of the whorls more numerous; palpi very short, white scaled; abdomen strongly compressed along the anterior two thirds, the apex dilated, with lateral and ventral groups of coarse bristles; front legs with the third and fourth joints silvery white beneath, the middle and hind legs light brassy beneath, on the mid legs becoming silvery white on the third and fourth joints, on the hind legs the apical half of the first, the second, third and basal part of the fourth joints silvery white beneath. Length, 4.5 mm.

Eleven specimens, Tabernilla, Canal Zone, Panama (August Busck, collector), part of the specimens bred from larvæ in bamboo joints, the others caught in a bamboo woods.

Type. — No. 10853, U. S. National Museum.

Wyeomyia panamena, new species.

Proboscis moderately stout, enlarged towards the apex; palpi short, silvery scaled at the apex; clypeus prominent, brown, with fine whitish pubescence; tori yellow with fine silvery pubescence; occiput entirely dark scaled with faint iridescence, white on the lower part of the side; prothoracic lobes large and prominent, well separated, clothed with blackish scales, a patch of whitish ones at the apices, the lower portion whitish scaled; mesonotum and scutellum clothed with brownish scales with bronzy and bluish luster; metanotum pitchy black, with a group of setæ near the apex; abdomen compressed, black scaled above, white beneath, the colors separated in a straight line on the sides; legs entirely dark with metallic luster, beneath the legs are bright bronzy. Length, 4 mm.

One specimen, Tabernilla, Canal Zone, Panama (August Busck, collector), bred from a pupa in a bamboo joint.

Type. — No. 10856, U. S. National Museum.

Wyeomyia circumcincta, new species.

♂. — Proboscis moderate, much dilated at the tip, black; palpi very short, dark scaled; occiput dark scaled with bluish iridescence, eyes narrowly margined with white; prothoracic lobes prominent, well separated, clothed with dark scales which have at the tip a violaceous coppery metallic sheen; mesonotum dark scaled, with bronzy and obscure bluish reflections, the front margin distinctly whitish scaled; scutellum clothed like the mesothorax; metanotum pitchy black, with a group of setæ near the apex; abdomen black above with blue and bronzy luster, creamy white beneath, the colors separated in a straight line on the sides; legs dark above with bronzy luster, beneath mostly with a light brassy whitish sheen, on the middle legs the apical half of the second and all of the succeeding joints completely encircled with silvery white; the brassy color of the under surface is interupted beneath by a dark shade on the first and second tarsal joints, the fore femora are mostly bronzy beneath on the apical half. Length, 3 mm.

Two specimens, Tabernilla, Canal Zone, Panama (August Busck, collector), bred from larvæ in the water in leaves of Bromelias.

Type. — No. 10857, U. S. National Museum.

Wyeomyia agnostips, new species.

Proboscis rather slender, distinctly swollen towards the tip, black scaled; palpi short, black scaled; clypeus prominent, black; occiput dark scaled, with blue and green iridescence, the eyes not margined by pale, a small silvery spot at the vertex, at the sides and beneath bright silvery; prothoracic lobes large and prominent, well separated, clothed with shining coppery scales, which become violaceous on the sides; pleura silver scaled; mesonotum clothed with brown scales, with slight metallic luster, basally and on the scutellum with faint greenish reflection, setæ at the bases of the wings and on the scutellum golden yellow; metanotum pitchy brown with a bluish bloom, a group of setæ towards the apex; abdomen compressed, clothed above with black scales with greenish luster, beneath with creamy white shining vestiture, the colors separated in a straight line on the sides; legs dark, brassy beneath, the middle pair with the apical three fourths of the second joint and all the succeeding joints silvery white on the inner side, hind legs with the fourth and fifth tarsal joints white on the inner side. Length, 4.5 mm.

One specimen, Tabernilla, Canal Zone, Panama (August Busck, collector), captured in bamboo woods.

Type. — No. 10858, U. S. National Museum.

Wyeomyia homothe, new species.

Proboscis long and slender, distinctly swollen at the apex; palpi very short, dark scaled, a few light scales at the tip; clypeus and tori light brown with fine grayish pubescence; wedge between the eyes broad, silvery scaled; occiput entirely dark scaled, the eyes without margin of light scales; prothoracic lobes large and prominent, well separated, clothed with brown scales with violet reflection, the apices broadly silvery as also the base below; mesonotum clothed with dull-brown scales, the setæ of the scutellum brown; metanotum pitchy brown, with a group of setæ towards the apex; abdomen compressed, black scaled above with greenish luster, extending well down the sides, the venter narrowly creamy-white scaled; legs long and slender, dark with bronzy luster, the mid legs with the third, fourth and fifth tarsal joints marked with white on the inner side, rather indistinct and only clearly visible in certain lights; scales of the wing-veins long and narrow. Length, 3 mm.

One specimen, Tabernilla, Canal Zone, Panama (August Busck, collector), captured in bamboo woods.

Type. — No. 10859, U. S. National Museum.

Wyeomyia hosautus, new species.

Proboscis rather short and stout, enlarged towards the apex, black scaled; palpi short, black scaled; clypeus prominent, black with fine grayish pubescence; the wedge between the eyes covered with silvery scales; occiput entirely dark scaled with blue and green iridescence, no pale margin to the eyes; prothoracic lobes large and prominent, well separated, clothed with dark scales, the apex silvery scaled as also the base below; mesonotum and scutellum clothed with brownish and blackish scales which show a bluish luster, setæ of the scutellum brown; metanotum deep brown with a group of setæ towards the apex; abdomen compressed, black scaled above, beneath creamy white, the colors separated in a straight line on the sides; legs dark with metallic luster, brassy beneath, the middle legs with the tip of the second and the succeeding joints silvery white on the inner side; wings with the scales of the veins short and broad on the outer half. Length, 3.5 mm.

One specimen, Tabernilla, Canal Zone, Panama (August Busck, collector), bred from a pupa found in a bamboo joint.

Type. — No. 10860, U. S. National Museum.

Wyeomyia leucopisthepus, new species.

Proboscis rather long and slender, swollen at the apex; palpi very short, black scaled; occiput dark scaled, with blue-green luster, the eyes evenly white margined, a small white spot on the vertex; prothoracic lobes large and prominent, well separated, clothed with dark scales, the apices and bases silvery scaled; mesonotum brown scaled, in front with a few whitish scales; metanotum blackish with a group of setæ towards the apex; abdomen black scaled above, white scaled beneath, the colors separated in a straight line on the sides; legs dark with bronzy luster, brassy beneath, on the hind legs the fourth and fifth tarsal joints are silvery-white scaled on the inner side except at their apices which are dark scaled; scales of the wing-veins long and narrow. Length, 2.5 mm.

One specimen, Tabernilla, Canal Zone. Panama (August Busck, collector), bred from larvæ in water in the leaves of Bromelias.

Type. — No. 10861, U. S. National Museum.

Wyeomyia macrotus, new species.

Proboscis rather long and slender, swollen at the apex, black scaled; palpi short, black scaled; clypeus prominent, black, with fine grayish pubescence; occiput dark scaled with bluish luster, a metallic spot on the vertex, no white margin to the eyes; prothoracic lobes large and prominent, well separated, blackish scaled, the tips and basal part white in certain lights and connected behind by a whitish band; mesonotum brown scaled, with faint bronzy and blue reflections, the hairs of the scutellum dark; metanotum dark brown with a few setæ near the apex; abdomen dark scaled above with bronzy and bluish luster, beneath creamy white, the colors separated in a straight line on the sides; legs moderately slender, dark with bronzy luster, brassy beneath; scales of the wing-veins mostly short and broad, a few longer ones in the region of the cross-veins. Length, 3 mm.

Three specimens, Boqueron River, Panama, and Tabernilla, Canal Zone, Panama (August Busck, collector), bred from larvæ in the water in the leaves of Bromelias. The pupa has remarkably long breathing tubes.

Type. — No. 10862, U. S. National Museum.

DESCRIPTIONS OF THREE NEW NORTH AMERICAN MOSQUITOES.

BY HARRISON G. DYAR AND FREDERICK KNAB,

WASHINGTON, D. C.

Aedes campestris, new species.

♀. — Proboscis straight, clothed with black scales and, on the basal half, with a sprinkling of yellowish gray ones; palpi short, black scaled with lighter scales intermixed; occiput pale ocher-yellow, a dark brownish stripe on each side of the median area, margins of the eyes lighter scaled, collar dark scaled; prothoracic lobes, pleura and coxæ roughly yellowish white scaled; mesonotum ochreous yellow, a broad rich brown stripe down the middle, basally two short brown stripes on each side of this; shoulders broadly marked with brown; scutellum pale ochreous scaled, the setæ pale shining yellow; abdomen dull yellowish white scaled, the second, third, fourth and fifth segments with large patches of black scales on each side of the middle, reaching the apex but not the base, these patches have a few whitish scales intermixed, on the succeeding segments these patches are indicated by a slight sprinkling of black scales, beneath the abdomen is entirely yellowish white scaled; legs with femora and tibiæ pale ochreous yellow scaled with a sprinkling of black scales, which becomes heaviest towards the apices of the tibiæ, first tarsal joint yellowish scaled sprinkled with black, the black becoming heavier towards the apex, the apex ringed with yellow-white, second third and fourth joints blackish above, ringed at both ends with yellowish white, the last joint entirely yellowish white, the tarsi show a brassy luster which tends to obscure the markings, on the fore tarsi the markings are more or less obsolete; wing-veins clothed with narrow dull yellowish white scales with a slight sprinkling of black ones. Claws all toothed. Length, 5 mm.

♂. — Palpi about as long as the probroscis, clothed with yellowish and dark scales intermixed, the pale scales predominating, the apical half with lateral long dense ferruginous and brown hairs with silky luster; antennæ rather short, densely plumose, the hairs pale brown and ferruginous with silky luster; abdomen long, depressed on the apical half, clothed with dull yellowish white scales, the lateral hairs abundant, pale yellow with silky luster. Length, 5.5 mm.

Fourteen specimens, Oxbow, Saskatchewan, Canada (F. Knab); Regina, Carnduff and Qu'Apelle, Saskatchewan, Canada (T. N. Willing, through Dr. J. Fletcher); Elsinore, Utah (E. S. G. Titus); Salt Lake, Utah (H. S. Barber).

Type. — No. 10874, U. S. National Museum.

Aedes riparius, new species.

♀. — Proboscis slender, dark scaled with a sprinkling of lighter yellowish scales· particularly towards the base; palpi short, dark scaled, with the apex and the median segment lighter scaled; occiput yellow scaled with brassy luster, a large brown spot on each side of the middle and another one well down the side; prothoracic lobes yellow scaled; mesonotum bright ferruginous brown with silky luster, at the bases of the wings and on the antescutellar area light yellow scaled, two submedian narrow longitudinal yellow lines reach the base on each side of the antescutellar area; scutellum yellow scaled, the setæ abundant and concolorous with the scales; metanotum brown; postscutellum clothed with dull yellowish white scales and with pale hairs; abdomen clothed principally with light scales above, at the bases of the segments the scaling is dull yellowish white and shades off into a light ferruginous on the lighter scales, on the apical two thirds of the segments there is a strong sprinkling of dusky scales which becomes predominant on the second, third and fourth segments, beneath the abdomen is entirely yellowish white scaled; legs with the femora and tibiæ pale ochreous scaled with a sprinkling of blackish scales which becomes very heavy at the apices, particularly on the tibiæ; tarsi black, with very broad basal yellowish white rings. Claws all toothed. Wing-scales brown, heavily sprinkled with yellow ones in the costal region, the scales long and narrow. Length 5.5 mm.

♂. — Palpi slightly longer than the proboscis, clothed with dusky and yellowish scales, which latter tend to form bands, the apical half densely clothed with brown and pale ferruginous hairs with a silky luster; abdomen long and slender, the apical half depressed, the marginal cilia long and dense, pale yellow. Length, 6 mm.

Sixty-eight specimens, Winnipeg, Manitoba, Canada (F. Knab), found along the banks of the Assiniboine River, among the trees. The female bites both by day and night.

Type. — No. 10875, U. S. National Museum.

Culex egberti, new species.

♀. — Proboscis moderately long and slender, swollen towards the tip, roughly black scaled; palpi short, black; occiput dark scaled, margins of the eyes dull whitish scaled; mesonotum brown scaled; pleura dark brownish with patches of whitish scales; metanotum dark brown; abdomen depressed, truncate at tip, black scaled above, without metallic luster, the segments with narrow white basal bands which are broadened at the sides, beneath with broad white basal bands; legs black scaled with bronzy luster, the femora light scaled beneath; claws equal and simple; scales of the wings long and dense, broad on some of the veins, uniformly brown. Length, 3 mm.

Three specimens, Warner's Camp, North Shore of Lake Okeechobee, Florida (J. H. Egbert).

Type. — No. 10870, U. S. National Museum.

Named in honor of Dr. J. H. Egbert, who collected these and other interesting mosquitoes in central Florida. Two of the specimens are distended with blood.

MOSQUITOES AS FLOWER VISITORS.

BY FREDERICK KNAB,

WASHINGTON, D. C.

In discussions of the feeding habits of mosquitoes one often finds the statement that mosquitoes suck the juices of plants and visit flowers to obtain honey. Generally, however, no details are given that would convince one that these statements are based upon actual observation. During the past season I found a species of mosquito frequenting flowers in large numbers. It was obvious from the behavior of these mosquitoes that the habit is quite normal with them. Confident that the habit, of mosquitoes, of visiting flowers could not have altogether escaped observation I made a hasty canvas of the available literature and brought together the following records of a more definite character.

Theobald states: "I have frequently seen Culicidæ settled on Compositæ, sucking the juices of the flowers, both males and females." * According to Giles "they are frequently found on flowers, and especially in England on the catkins of the willow." † Ficalbi found the first male of his *Culex albopunctatus* upon a flower, sucking the honey, and upon searching the woods he found numbers of the males thus engaged upon flowers of the same kind. ‡ A number of records were traced through Knuth's Handbuch der Blütenbiologie. Hermann Müller has observed the male of *Culex pipiens* sucking on the flowers of *Rhamnus frangula.* § He has observed, in his room, this same species of mosquito effecting the fertilization of *Lopezia coronata* by releasing the pollen and transmitting it to the stigma of an older flower. || Burkill in observations on the flower-visitors of *Mentha aquatica*, made at Scarborough between September 20 and October 7, found an *Anopheles* species "four times, seemingly sucking honey." ** The sex is not indicated.

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* Theobald, F. V.: Monogr. Culicidæ, Vol. I, 1901, p. 69.

† Giles, G. M.: Handbook of Gnats or Mosquitoes, 2 ed., 1902, p. 114.

‡ Ficalbi, E.: Venti specie di zanzare (Culicidæ) italiane. Bull. Soc. Ent. Ital., Vol. XXXI, 1899, pp. 107, 186.

§ Müller, H.: Die Befruchtung der Blumen durch Insekten, 1873, p. 153.

|| *L. c.*, p. 198.

** Willis, J. C. & I. H. Burkill: Flowers and Insects in Great Britain, Pt. I, Annals of Botany, Vol. IX, 1895, p. 256.

The foregoing records are all European. Several American observers have noted mosquitoes on flowers. Robertson, in a list of insects found on the flowers of *Ceanothus americanus* between June 19 and 29 includes an undetermined species of Culicidæ.[*] Smith has found the males of *Aedes sollicitans* "in great numbers in wild cherry blossoms in the early evening, apparently busied in getting at the nectar. Females have been observed at the same time; but apparently these abandoned the vegetable food readily, when the animal odor advised them of something more to their taste."[‡] Dr. Graenicher lists *Aedes stimulans* among the flower-visitors of *Smilax herbacea* and *Smilax hispida.*[§] No further data are given and upon inquiry Dr. Graenicher informed me that he has no notes which would supply details regarding these observations. However he has very kindly furnished me the following interesting observations upon *Aedes sylvestris*, recently made by him, which I give verbatim.

"At the beginning of August, while collecting the visitors of our earliest species of goldenrod, *Solidago juncea*, I came across a species of *Culex* on two different occasions. Before writing to you on this subject I preferred to follow up the matter more closely. Last Sunday [Sept. 1] the opportunity presented itself, and I found *Culex sylvestris* Theo. (determined by Mr. C. T. Brues, Public Museum of Milwaukee) on the flowers of the following three species of *Solidago*: *juncea* Ait., *canadensis* L., and *lanceolata* L. (*Euthamia graminifolia* (L.) Nutt. in Britton's Manual). This species of *Culex* is common in our region, and it was well represented on the flowers throughout the afternoon, but especially towards evening. Males and females were present, *both* eagerly sucking nectar. By approaching them cautiously I was able to observe their actions very distinctly with the aid of a lens. During the earlier part of the afternoon the females (which by some are supposed to partake of animal juices only) were present in greater numbers than the males, but later on both sexes were about equally represented."

My own observations were made last spring upon *Aedes spenceri*

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[*] Robertson, Ch.: Flowers and insects, III. Bot. Gazette, Vol. XIV, 1889, p. 304.

[†] Howard, L. O.: Mosquitoes, 1902, p. 36, and Smith, J. B.: Report, mosquitoes of N. J., 1904, pp. 27, 203.

[‡] Graenicher, S.: Flowers adapted to flesh-flies. Bull. Wisc. Nat. Hist. Soc., Vol. I, no. 1, 1902, pp. 33, 34.

Theo. during my stay in Saskatchewan. I shall give some particulars of the life history of this species as they throw some light on its feeding habits. This species develops in immense numbers from the numerous ditches and temporary pools of snow-water scattered over the prairie. The females are voracious blood-suckers and in the early part of the summer make life on the prairie a torture for man and beast. The species is strictly diurnal. The season was an unusually late one this year and the first mosquitoes were seen flying on May 30. The first males were seen swarming on June 5. After several cold, damp days the mosquitoes were again active on June 9, the females biting, the males swarming. The following day there was a very high wind which confined the mosquitoes to their retreats in the grass. June 11 was a hot day with only light wind. On an excursion into the prairie, early in the afternoon, the female mosquitoes were found much fewer in number, perhaps as a result of the great heat. No males were seen swarming, as had been the case on previous favorable days. However, upon examining the willow bushes along the margins of ponds and ditches the males were found in numbers upon the willow catkins. Often there were five or six on one catkin, confining themselves to that part of it which was in full bloom. They climbed about on the stamens and probed down amongst them to get the honey. They appeared very eager in this work, plunging the proboscis down for a second then quickly withdrawing it to reinsert it in another place, sometimes even scrambling over each other in their eagerness. The palpi, together with the antennæ, are held erect nearly at right angles to the proboscis. There were also a few females at the willow catkins, feeding in the same manner as the males but less eagerly. The following day, June 12, was warm but very windy. Along the river bank the mosquitoes were again found abundant upon the willow blooms, and this in spite of the high wind which must have made it very difficult for them to maintain their position. As before, most of the mosquitoes on the catkins were males. Although there was an abundance of flowers of various kinds on the prairie at this time none of these were visited by the mosquitoes. A period of continuous violent wind followed. When this had subsided the mosquitoes were again investigated on June 18. The males had now nearly all disappeared; there were none upon the willow catkins and only a very few could be obtained by beating.

Several points are brought out by these data. The life of the male mosquito does not, at the most, extend over more than two weeks. The males do not appear to take food until after the period of swarming or copulation, nor, in spite of the food taken, do they survive long after the mating period. The females probably only resort to flowers when very hungry and blood is not obtainable. It should be borne in mind that these deductions apply in particular to *Aedes spenceri*. Now that we are more familiar with the habits of individual species of mosquitoes it is obvious that no statements which apply generally can be made from observations on the habits of one species. Thus, according to Dr. Graenicher's observations, the females of *Aedes sylvestris* visit flowers in equal numbers with the males. This species, although a well-known blood-sucker, is not so agressive and persistent in its quest for blood as *Aedes spenceri*. Moreover it is crepuscular in habit and therefore most abundant on the flowers in the evening, while *Aedes spenceri* frequents them during the day. *Aedes sollicitans*, both sexes of which have been observed by Smith upon flowers, is noted as a most persistent blood-sucker. In fact in all the species recorded in the foregoing as flower visitors the females suck blood. In these hæmatophagous females the nectar of flowers may be considered as a supplementary food which prevents starvation when blood is not available. With the males nectar appears to be the natural food. It is hardly to be supposed that species of mosquitoes limit themselves to particular flowers nor is there any structural modification that would indicate adaptation to certain flowers, such as exists, for example, in the flower-visiting Hymenoptera. The great diversity of flowers visited by mosquitoes bears this out. With the mosquitoes it is probably merely a question of easy accessibility of the nectar and also of the season in which a particular species of mosquito makes its appearance. As the appearance of many species of mosquitoes is regulated by conditions of rainfall which vary from year to year, the flowers available to a given species cannot always be the same.

There are a considerable number of species of mosquitoes which do not suck blood at all and of the feeding habits of these we know nothing. Such are a few of our common species. The little pitcher-plant mosquito, *Wyeomyia smithii* Coq., does not suck blood. Neither does *Culex territans* Walk., a very common species throughout the summer in eastern North America. *Culex melanurus* Coq. apparently does not bite. These species probably obtain nourishment from plants in some form or other. Observations on the habits of such species are yet to be made.

In conclusion I wish to place on record an observation on *Megarhinus septentrionalis* D. & K., our largest mosquito. On July 14 of this year I found a female of this species at Glen Carlyn, Va., probing for honey upon a cyme of *Hydrangea arborescens* L. The mosquitoes of the genus *Megarhinus* are so rare that very little is known of their habits, but it appears quite certain that they do not attack animals, indeed, their proboscis is unfit for piercing the skin. Probably they feed wholly upon the nectar of flowers, but as they are very rare, even in their proper home — the tropics, and withal very shy, it is not strange that they have escaped observation.

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Class I, HEXAPODA.

Order V, LEPIDOPTERA.

THE LIFE HISTORIES OF THE NEW YORK SLUG-CATERPILLARS. — XIX.

By Harrison G. Dyar, Ph.D.,
Washington, D. C.

The series of papers under this title ceased in 1899 with the description of *Natada nasoni* Grt., and a concluding general account was given. I am now enabled to add another life history of a species found in New York state, at least occasionally, as Mr. Joutel has taken the larvæ on Staten Island.

Isochætes beutenmuelleri Hy. Edw.

1887 — *Limacodes beutenmuelleri* Hy. Edwards, Can. Ent., xix, 145.
1892 — *Semyra beutenmuelleri* Kirby, Cat. Lep. Het., i, 534.
1894 — *Semyra beutenmuelleri* Neumoegen & Dyar, Journ. N. Y. Ent. Soc., ii, 71.
1895 — *Phobetron beutenmuelleri* Dyar, Can. Ent., xxvii, 245.
1899 — *Isochætes beutenmuelleri* Dyar, Journ. N. Y. Ent. Soc., vii, 208.
1902 — *Isochætes beutenmülleri* Dyar, Bull. 52, U. S. Nat. Mus., 356, no. 4090.
1905 — *Isochætes beutenmuelleri* Dyar, Proc. U. S. Nat. Mus., xxix, 387.

Larva.

1878 — Glover, Ill. No. Am. Ent., pl. 11, fig. 1; pl. 20, fig. 40 (no name).
1899 — Dyar, Proc. Ent. Soc. Wash., iv, 300 (larva no. 2).
1899 — Dyar, Journ. N. Y. Ent. Soc., vii, 209, 236.
1902 — Joutel, Journ. N. Y. Ent. Soc., ix, 190.

SPECIAL STRUCTURAL CHARACTERS.

Outline elliptical, exclusive of the appendages; dorsal space even, broad flat; lateral space broad, subventral moderate, not retracted, the spaces continuous, not separated by ridges, which are indicated by the changes in direction of slope of the spaces. Tubercles greatly modified as in *Phobetron pithecium*, the first stage also as in that species, single everted spines with the basal half thickened, all alike. Tubercle iii of joint 5 is absent. There result three warts on joints 3 and 4, one on joint 5, and two each on joints 6 to 13, though only a trace of the lower one of joint 13 remains. The warts are produced into fleshy appendages, which are easily detachable, and deciduous at maturity. They are capable of regeneration in the earlier stages. Those of joint 3, the two lower of 4 and all the abdominal lateral row are small, conical, contracted at base and bear but few hairs toward the tip. The subdorsals of joints 4 to 12 are much more highly modified. They are applied by very broad bases, though the actual attachment is small, and cover nearly all of the dorsal and upper half of the lateral spaces, the fringing hairs finally obscuring the sides and lateral hairs from view. The terminal horn, bearing seta ii, is long and slender; at its base is a prominent circular bulb which bears seta i at its outer side; finally in the dorsal space is a pair of sparsely haired processes for each horn and another such in the lateral space, which appear to function as supporting structures. They are basal prolongations of the appendages. The warts bear at first stiff, smooth, pale setæ. Gradually these become converted into a series of fine feathered hairs, smooth at base and banded with black pigment, which replaced the smooth hairs nearly entirely, covering the larva with a dense fluffy coat, partially obscuring all the structures and giving the general appearance of a green hairy disk. The skin is covered with a sparse coating of colorless hairs from rather large clear tubercles. Depressed spaces imperceptible. The skin is very thick and transparent, which gives a glassy appearance to the larva; the centers of the horns appear as small green cores in a tube of glass and the basal forks of the subdorsal horns are especially bright and shining. In the first stage the tubercles are represented by single long spines of equal length throughout, the subdorsals of joints 5, 7, 9 and 11 only differentiated by a slight difference in direction of slope. In the immediately following stages the subdorsal appendages of joints 7, 9 and 11 are much shorter than the others, exactly as in *Phobetron pithecium*, but toward maturity all the appendages become equally long. The laterals of these segments are also slightly shorter than the other laterals.

These segments, 5, 7, 9 and 11 seem to be "weak" segments, like joint 11 in *Acronycta*, which Dr. Chapman has described. The weakness is shown, in the *Phobetron* group of species, on joint 5 by the absence of the lateral horn; on 7, 9 and 11 by the alternation of the setæ in stage I and the shortness of the horns on those segments subsequently.

AFFINITIES, HABITS, ETC.

The larva is closely allied to *Phobetron pithecium* Sm. & Abb., and to *Alarodia slossoniæ* Pack. In color, the equal length of the horns, and less closely in the hair structure it is nearest *slossoniæ;* but in the number of the horns and their arrangement and the narrowness of the dorsal space it is identical with *pithecium*. The adults, too, present a sexual dimorphism, and are somewhat similarly colored to *pithecium*, to which on the whole, it is most nearly allied. In this species the subdorsals of joints 4 to 11 only are functional, while in *slossoniæ* those of 3 to 12 are so and the side horns are much more completely suppressed than in *beutenmuelleri* and *pithecium*. *Beutenmuelleri* is structurally congeneric with *pithecium*. Its adaptation is different; being glass-green with whitish fluffy hair, and this probably necessitates the equal length of the horns. Otherwise the larvæ differ but slightly. The lateral horns are longer and slenderer than in *pithecium*, and their hairy coating has more degenerated. The subdorsals have the basal bulbs circular and prominent, not flattened-cordate, and their dorsal forks are slenderer and interlace on the back. The hairs remain long and less specialized than in *pithecium*. The horns are more readily detachable. In *slossoniæ* the horns remain attached throughout life and are found within the cocoon; in *pithecium*, they are shed spontaneously at the time of spinning, and are found attached to the outside of the cocoon; but in *beutenmuelleri* they are shed in a mass as soon as the larva has ceased feeding and before it leaves the tree to seek a place to undergo its transformations. During life, a slight touch serves to detach the horns, which are nevertheless not deciduous at moulting.

The species ranges along the coastal region to the foot of the Appalachians, from northern Florida to southern New York. It should occur on Long Island, though I have not found it there. It probably ranges along the Gulf coast to Texas, although all records are lacking, and perhaps in the Mississippi valley west as far as the forests extend. The species is single brooded, the adults emerging during July, the larvæ maturing in September and October. There is no special food plant, any smooth-leaved tree in the right location will serve. The usual trees inhabited by Limacodids are chosen, the small-leaved red oak being the favorite. Location is more important than the particular tree, the larvæ preferring overhanging boughs without close undergrowth, generally about five feet from the ground, never low down. On large trees they may occur at a considerable altitude. The eggs are laid singly and generally well scattered, seldom many larvæ occurring on one tree, usually but one. They are placed on the back of the leaf, not adjacent to a rib. The young larvæ at first eat little holes through the lower epidermis and parenchyma and travel about a good deal, especially between the stages, although of course never leaving the original tree. Later they eat the whole leaf from the end, as is the general habit of the family. The larva, after shedding its horns, leaves the tree and spins a small hard round cocoon on the ground, where the winter is passed.

CRITICISM OF PREVIOUS DESCRIPTIONS.

The larva was figured by Glover nine years before the adult was known. I have commented on his figures, in which the bulbs of the subdorsal horns were interpreted by me as the horns themselves and the horns as laterals, owing to a wrong appearance given by the figures. I have also quoted the notes on the larva preserved in the Department of Agriculture, written, I think, by Mr. Pergande, in which an attempt is made to describe the peculiar structure of the tubercles, which is really scarcely understandable when taken alone, without comparison with allied forms. A good idea of the beautiful appearance of this insect is given in the account. I sent formerly photographs of the mature larva to Mr. A. R. Grote, who exhibited them before the entomological society at Hildesheim. He reported that the society was struck dumb, having never imagined that a larva could have such a strange and beautiful appearance. "The creature, as it moves, seems to be one mass of delicate floss of finely spun glass," as described in the Agriculture notes, to which may be added that the spun glass rests upon a series of clear green cones with a row of beads at their bases.

DESCRIPTION OF THE SEVERAL STAGES IN DETAIL.

Egg. — Elliptical, flat; shell white, evidently colorless and transparent, shining like a drop of water as usual; reticulations faint, angular. Size, 1.4 × 1.1 mm. (Chain Bridge, Va.); 1.1 × 1.0 mm. (Tryon, N. C.).

Stage I. — Elliptical, somewhat flattened dorsally, the anterior end thickened, tail slightly tapering; all smooth shining translucent whitish, the food giving a green tint. Head small, white, concealed in joint 2. Spines long, tapered, single, with a false central joint, three rows on the thorax, two on the abdomen (except joint 5), as in *Phobetron pithecium;* colorless, whitish. The alternate ones on joints 7, 9 and 11 of the subdorsal row lean outward. Lateral row equally long and alike, uniform. The subdorsal ridge is a little more opaquely whitish than the rest. Length, 1 to 1.6 mm.

Stage II. — Elliptical, thick, flattened; subdorsal horns thickly conical, short, placed around the subdorsal margin, of about equal length except three pairs, which are very short and the posterior pair, which is intermediate. There are three long horns before, then three short ones, alternating with two long ones, and last the intermediate posterior pair. Bases of horns roundedly thickened, leaving a narrow dorsal groove. All sparsely covered with short, pale hairs. Lateral horns minute, concealed. Translucent whitish green, like glass. Head whitish, within the hood of joint 2. Length, 1.4 to 2.4 mm.

Stage III. — Elliptical, flattened; dorsal space narrow, groove-like between the bases of the horns; lateral and subventral spaces also small, mostly occupied by the large bases of the subdorsal horns; these are situated on joints 4 to 12, long, blunt and rather thick, a little tapering and projecting laterally, parallel to the leaf and not far above it, of equal length except the fourth, sixth and eighth pairs which are about two thirds the length of the others. Horns of joint 3, the lateral ones the whole length and the subdorsal of 13 short, shaped like the subdorsal ones but about one eighth their length and obscured from dorsal view. The subdorsals have at the base above a round, button-like prominence, distinctly constricted off from the horn and as high as wide. Hairs moderately numerous, on all the horns, short, stiff, colorless, with tubercular bases. Color green, mostly in the tips of the horns. The skin is thick and transparent, the pigment forming a small green core in the horns. Skin with sparse fine clear granules. There are only smooth setæ on the horns except the terminal primary ones (ii) which are more slender and have a truncate conical base. The subdorsal horns have a small cordate base dorsad of the rounded knob. Skin glassy, shining. Length 2.4 to 3.7 mm. (Tryon, N. C.); to 2.9 mm. (Rosslyn, Va., No. 1); to 3.2 mm. (Rosslyn, Va., No. 2); to 3.8 mm. (Chain Bridge, Va.).

Stage IV. — Subdorsal horns all long and equal (Rosslyn, Va., No. 3) or those of joints 7, 9 and 11 still shorter than the others, about three fourths their length (Rosslyn, Va., No. 1); otherwise the same in shape and color. There are three horns on joint 3, the upper one quite long, but subordinate to the others of the subdorsal row and without the basal button, the middle one small, the lower very small. Three horns on joint 4, the upper a functional horn, the others in a pair below it. Subdorsals of joints 5–12 equal to the subdorsal of 4 and very nearly uniform; subdorsal of 13 quite small, subordinated. Laterals of joints 6 to 12 small, but all haired like the subdorsals. Basal buttons hemispherical with the same clear spiny hairs. Skin finely setose-granular. Color green from the horn-cores as before.

The hairs on the bases of the bulbs and horns are simple, but a few of those towards the tips are lengthened out and spinulose as in *Alarodia slossoniæ*. The dorsal groove appears darker than the rest. During the stage, the horns in the second example (Rosslyn, Va., No. 1) became all the same length, the short ones growing out. Length, 2.9 to 5.1 mm. (Rosslyn, No. 1); 3.2 to 4.4 mm. (Rosslyn, No. 2); to 4.6 mm. (Rosslyn, No. 3); 3.8 to 5 mm. (Chain Bridge).

Stage V. — Flattened elliptical, the radiating horns forming a flat disk; dorsal groove narrow, edged by the round bulbs of the horns of joints 4 to 11, the horn of joint 12 small. Horns nearly equal, those of joints 4 to 6 a little shorter, especially in front, gradually becoming longer posteriorly. Green, especially the outer two thirds of the horns, the body more whitish; dorsal groove darker. Hairs more numerous than before, all simple on the basal bulbs but of different lengths, shorter around the bases of the horns; at the ends of the subdorsal horns many of the hairs are lengthened and finely feathery spinulose beyond the base, forming a fringe that fills up the space between the horns, the whole composing a flat disk and touching the leaf. Side horns all obscured. Skin setose-granular as before. The basal fork of the subdorsal horns is small and obscure, dominated by the large, nearly spherical bulb that corresponds to tubercle i. The green color is very like that of the leaf. Length, 4.6 to 6.3 mm. (Rosslyn, No. 3); 5 to 5.2 mm. (Chain Bridge); 5.1 to 7 mm. (Rosslyn, No. 1).

Stage VI. — Shape and appearance the same. The dorsal groove is very narrow, the forked bases of the subdorsal horns almost touching, the two rows of nine bulbs separated by about their own width, except those of joints 4 and 12, which touch. Horns of joints 4 to 12 moderately long, horizontal, alike, the anterior ones only a little shorter. Whitish green, the distal part of the horns brighter green. Hairs on the bulbs all simple with enlarged bases, numerous; terminal primitive seta of the long horn simple, all the fringe-hair finely barbuled beyond the base; many of the short hairs on the dorsal aspect of the horn have the distal half densely feathered. Head round, green, about .8 mm. wide. Skin granules small, remote, bearing rather long pale setæ Length, 5.2 to 7.5 mm. (Chain Bridge); 6.3 to 8.2 mm. (Rosslyn, No. 3); 7 to 9.5 mm. (Rosslyn, No. 1).

Stage VII. — As before. All bright green, shining under the hairs, so as to be a pale, glassy color, only the very tips of the long horns yellowish green. Horns flat, spreading longitudinally, the whole larva very flat, its dorsal groove narrow and edged by the circular knobs as before. Anterior pair of subdorsal horns (joint 4) rather shorter and a little curved backward; the last pair (joint 12) also rather shorter. Hairs fine, white, rather long, crossing from the adjacent horns and fringing the larva all around. Most of the marginal hairs are long and spinulose, some of those on the dorsal aspect and now also around the edges of the knobs. Hairs nearly all of the feathered type, at least in part. Nearly all are partly reduced in length, the tip being slender and weak, the shaft a little thickened centrally with a black band before the thickening. Even the fringe hairs are so and especially those on the edges of the bulbs. All the hairs seem to be essentially so modified, though those on the tops of the bulbs are still primitive, but they are black banded, and grade off into the ones on the sides. Dorsal furcate roots of the horns long and slender, touching sideways in pairs and joining across the dorsum, nearly smooth at base, the small area of skin left, sparsely granular. Seta i on a long clear conical base with some smooth slender hairs around seta ii without accompanying hairs. The side horns are slender, over one third the length of the long subdorsal, with a terminal tubercle bearing iii and a number of rather slender transparent hairs, some of which, towards the tips are slightly short-spinulose. No pigmented areas. In certain views, part of the side horns are visible from the dorsal aspect between the long ones, but only with care. Length, 7.5 to 11.5 mm. (Chain Bridge): 8.2 to 11 mm. (Rosslyn, No. 3); 9.5 to 12.5 mm. (Rosslyn, No. 1); to 12 mm. (Tryon, N. C.).

Stage VIII. — Markedly different by the great increase in the number of hairs. So dense as to almost completely obscure the structure. The top is even and flat, many of the hairs directed straight upward, the whole resembling a fluffy disk with even, broadly elliptical outline. Shape and structure essentially as before, but the long horns are flexible and their tips bend backward or downward. Hairs nearly all of the black-banded, white-feathered-tip type, except some long ones about the ends of the long horns which are white, more slender, scarcely feathered and resemble those that still persist about tubercle i. The hairs from the bulbs rise nearly erect and all meet to conceal the dorsal groove. The surface is formed by the ends of the hairs, consequently the bulbs themselves do not show in front or side view any longer, and the outlines of the horns are obscured by the overlapping of the fringe hairs. No shortened or aborted hairs, *i. e.*, not more so than the usual feathered hair is so. Green, whitish, somewhat opaque, glassy translucent; the hairs look all white, the black bands do not alter the appearance as the white feathered tips are prominent, only seen with a lens. Head green, the eyes, labrum and a mark each side brown. The horns on joint 12 are shorter than those on joint 11, so the disk is truncate behind; horns of joints 4–5 are more proportionate but shortened.

Later the larva became thicker, 6 mm. high, whiter and more glassy shining. It is quite thick, the horns drooping to the leaf. The horns are slender, and from side view the lateral horns are visible through the haze of hairs. Bulbs circular from top view, higher than wide. There are furcate bases on the sides of the subdorsal horns reaching to the holes that represent depressed spaces (4). These forks, both in the dorsal and lateral spaces are the most glassy part of the larva. Side horns on joints 6 to 12 slender, equal, sparsely haired above and toward tip (as those of joints 3 and 4 are all over), but below with dense white hairs that cover the spiracles. Spiracle of joint 5 high up; spiracles brown, round. Length, 11 to 15.5 mm. (Rosslyn, No. 3); 11.5 to 15.5 mm. (Chain Bridge); 12.5 to 17.5 mm. (Rosslyn, No. 1); 12 to 16 mm. (Tryon, N. C.).

On reaching maturity the larvæ shed the long subdorsal horns and entered the ground to spin.

Cocoon. — Subspherical, hard, dark brown, with a round concealed lid at one end, as usual.

Pupa. — Formed in the Spring, after the hibernation of the larva. Thin-skinned, pale colored, emerging from the lid of the cocoon, as usual in the family.

EXPLANATION OF PLATE II.

1. Larva, stage II, dorsal view.
2. Larva, stage III.
3. Larva, stage IV.

4. Larva, stage IV, at end of stage, showing the side horns.
5. Mature larva.
6. One of the deciduous subdorsal horns, lateral view, showing attachments.
7. Hairs at tip of the horn, stage IV, enlarged, showing primary seta ii.
8. Hairs on the outer side of the bulb, showing primary seta i to be differentiated from the secondary hairs.
9. Hairs on the bulb, stage V, showing the beginning of the plumose setæ.
10. A plumose seta, further enlarged, showing the black pigment band.
11. Bulbs and dorsal space, two segments to show the projection of the horn-attachments into the dorsal space.

◆

NEW AMERICAN LEPIDOPTERA.

By HARRISON G. DYAR,
WASHINGTON, D. C.

Family SYNTOMIDÆ.

Cosmosoma myrodora, new species.

Head shining blue; thorax red, the tegulæ with two blue spots; patagia lined with black, with a blue spot at the base of the wing; palpi black, red at the base; abdomen red, a dorsal black band beginning on the second segment and widening posteriorly, containing a row of metallic blue spots, the last three segments wholly black; venter black, the wool under the ventral valve of the ♂ white; legs red, the middle femora blackish without; antennæ black with white tips. Wings hyaline, the veins and margins black, the band widening at apex of fore wings. Expanse, 34 mm.

East coast of Florida; Indian River (C. V. Riley coll.), Palm Beach (Dyar), Miami (Schaus coll.).

Type. — No. 10739, U. S. National Museum.

This species has been known as *Cosmosoma omphale* Hübn. and *Cosmosoma auge* L., but it differs from the species bearing those names in the extent of the black band, which begins on the second abdominal segment and does not touch the thorax.

Syntomeida jucundissima, new variety.

The form of *Syntomeida epilais* occurring in southern Florida differs from its Mexican and central American representative in the greener tint of the wings, the reduction of the white markings, the wing spots being smaller and the markings on the feet less, and in the different color of the terminal abdominal segments, which are scarlet in the Floridian form, crimson in the Mexican one. The above new name is proposed for the Floridian subspecies.

Palm Beach (Dyar), Miami (R. Ottolengui coll., Schaus coll.), Cocoanut Grove (E. A. Schwarz).

Type.—No. 10742, U. S. National Museum.

Family LITHOSIIDÆ.

Crambidia roberto, new species.

Fore wings with accessory cell, silvery gray, shining, uniform; hind wings and abdomen dark gray. Vertex and front of head bright ocherous. Beneath entirely dark gray like the hind wings above, the fore wings somewhat shining. Expanse, 28 to 30 mm.

Two males, Mexico City, Mexico, June, 1907 (R. Müller, No. 1040).

Type.—No. 10455, U. S. National Museum.

Hæmatomis radians, new species.

Closely allied to *Hæmatomis mexicana* Druce, the fore wings being the same. In the hind wings there are two whitish rays from the base to the margin on a uniform gray ground in both sexes, whereas in *mexicana* the hind wings of the ♂ are whitish with gray costa, of the ♀ entirely gray including the fringe.

Three specimens, two ♂♂, Orizaba, Mexico (Wm. Schaus coll., R. Müller, No. 1162), one ♀, Cordoba, Mexico (Wm. Schaus coll.).

Type.—No. 11019, U. S. National Museum.

Rhabdatomis, new genus.

Venation of *Diarhabdosia* Hampson, except that vein 5 is present on the hind wings. The genus falls in Sir Geo. Hampson's table with *Eurosia*, an East Indian and African genus (Cat. Lep. Phal. Brit. Mus., ii, 330, 1900), from which it differs in having viens 3 and 4 of the hind wings stalked, not coincident, and vein 11 of the fore wings curved, not straight.

Type.—*Rhabdatomis zaba*, n. sp.

Rhabdatomis zaba, new species.

Head yellow on the vertex, thorax yellow tinged with pink, abdomen yellowish; fore wings gray, the costa, a ray from base to below apex and the internal margin broadly yellow; hind wings whitish, the inner margin yellow, the costa and the apex broadly gray. Beneath as above, the ray on fore wing less distinct. Expanse, 19 mm.

One ♂, Orizaba, Mexico (Wm. Schaus coll.).

Type.—No. 11020, U. S. National Museum.

Diarhabdosia cora, new species.

Head yellow on the vertex, thorax tinged with pink, abdomen ocherous in the male with a gray basal tuft, gray in the female; fore wings straw-yellow with a large gray band from base to apex, narrowly cut by a pinkish yellow ray; hind wings yellow in the male with a broken gray outer border, gray in the female with a yellow costal edge. Expanse, ♂ 15 mm., ♀ 19 mm.

18 specimens, three of them females, St. Jean, Maroni, French Guiana and 60 miles up the Maroni River, French Guiana (collection of Wm. Schaus).

Allied to *Diarhabdosia laudamia* Druce, but much smaller, the ♂ with a broken outer gray border on the hind wings instead of a large gray tip, the ♀ with the costa of the hind wings broadly yellow above and below instead of entirely gray.

This species was not described by Mr. Schaus, as at the time we had identified it as *D. laudamia*. However, I now think it abundantly distinct.

Type. — No. 10920, U. S. National Museum.

Diarhabdosia mandana, new species.

Body yellow, overspread with gray, a pink tint on the tegulæ, the abdomen heavily gray shaded in the ♀. Fore wings straw-yellow, nearly covered by a broad gray band that extends from base to apex, touching the costa subapically and the internal margin at base and just before tornus, divided by a central pale ray. Hind wings whitish in the ♂ with a gray tip, gray in the ♀ with the costa yellow nearly to apex. Expanse, ♂ 22 mm., ♀ 23 mm.

Three males and two females, Castro, Parana, Brazil, and Rio Janeiro, Brazil (collection of Wm. Schaus).

Distinguished from the other species by the yellow along the inner margin of fore wings being divided by gray at base and outwardly. Sir G. F. Hampson has identified this species as *D. laudamia*, but I think it must be a distinct species.

Type.— No. 10921, U. S. National Museum.

Diarhabdosia laudamia Druce.

This species is before me from Mexico, Costa Rica and Peru. The synonymy given by Sir G. F. Hampson (Cat. Lep. Phal., II, 518, 1900) appears to be correct. He cites the species from Guatemala, Costa Rica, Panama, Ecuador, Peru and Brazil. The latter locality is probably wrong.

Family ARCTIIDÆ.

Calidota angelus, new species.

Head white in front, margins of the eyes and vertex crimson; thorax white above, grayish below, a crimson patch at base of wing; legs gray, fore coxæ margined with crimson; abdomen crimson above, white below with a lateral gray line; fore wing gray, the veins narrowly but diffusely white, the costal edge and fringe white; hind wing white: beneath as above, the white lining on fore wing absent. Expanse, 35 mm.

One ♂, Mexico City, Mexico, July, 1907 (R. Müller, No. 1141).

Type. — No. 10923, U. S. National Museum.

Apparently nearly allied to *Pygarctia elegans* Stretch, but the presence of the accessory cell forbids its reference to that genus. The fore tibia has a very large curved apical claw.

Euchætes psara, new species.

Head, pectus and thorax blackish gray, rather roughly haired; abdomen blue-black above, gray below, the anal tuft crimson, smoothly haired except at base where there is a large blackish gray tuft; legs dark gray, the fore coxæ crimson. Fore wing dark gray, sprinkled with white scales, which predominate in an area below the cell and in an oblique wavy band from outer third of inner margin directed towards apex but becoming obsolete above. Hind wing semidiaphanous whitish sprinkled with gray and with a broad gray area along costa and a narrow one on inner margin, the veins dark; beneath as above, the markings of the fore wing not visible. Expanse, 31 mm.

One ♂, Mexico City, Mexico, August, 1907 (R Müller, No. 1211).

Type. — No. 10924, U. S. National Museum.

Family CERATOCAMPIDÆ.

Syssphinx colla, new species.

Head and thorax ocherous brown, patagia violaceous. Fore wings rather dark pinkish brown, the basal and marginal spaces shaded with violaceous; inner line lost; outer line straight from apex to near middle of inner margin, broad, shaded, blackish violaceous; discal dots two, white, small, in a faint brown cloud; wing sprinkled with blackish specks. Hind wings overspread with crimson, the outer margin colored like the fore wing, violaceous tinted on the edge; a large round obscure blackish discal spot. Beneath the fore wings are crimson on the disk, a large round black discal spot; outer margin gray at the apex, widening below. Hind wings violaceous whitish tinted, grayish at the apex, marked with darker strigæ along the costa. Abdomen yellowish brown above, colored like the fore wings below beneath. Legs dark gray. Expanse, 80 mm.

One male, Orizaba, Mexico (R. Müller, No. 982).

Type. — No. 10448, U. S. National Museum.

Family NOCTUIDÆ.

Acontia areletta, new species.

Head black on the vertex, thorax and abdomen creamy white. Fore wings creamy white at the base, crossed by several pale gray waved lines; space beyond the median line nearly solidly filled in with leaden gray and black, the creamy ground showing only subterminally; reniform and orbicular rounded, blackish filled, rather large and similar; below the orbicular a curved black line followed by leaden shading; a costal, subapical, quadrate, pure white patch, preceded and followed by a small white dot. Hind wings white, immaculate. Beneath the markings of upper side faintly repeated. Expanse, 27 mm.

One male, Mexico City, Mexico, June, 1907 (R. Müller, No. 1039).

Type. — No. 10457, U. S. National Museum.

Closely allied to *Acontia areli* Strecker, but the white patch on the fore wings is much larger and the hind wings are immaculate.

Noctua exculpatrix, new species.

Head brown, front black between the eyes; thorax purplish brown, intermixed with black scales, the abdomen lighter. Fore wings broad, purplish brown, the maculation reduced to streaks on the veins, the ordinary lines obsolete; vein 1 blackish lined the whole length, median with veins 3 and 4 continuously black, except for a slight interruption beyond the position of the transverse posterior line, which is slightly indicated by a row of venular dots; veins 2, 5, 6, 7 and 8 lined with black scales, continuously so toward the margin; a row of intravenular whitish dashes indicating the subterminal line; terminal space darker, more grayish than the rest of the wing. Hind wing soiled whitish, the outer margin broadly smoky; veins lined in blackish. Beneath the costæ of both wings are roseate brownish, spreading at the apices; rest of the surface whitish; outer line indicated in a broad smoky band. Expanse, 38 mm.

One female, Elsinore, Utah (U. S. Dept. Agriculture, Bureau of Entomology).

Type. — No. 10822, U. S. National Museum.

Allied to *Noctua piscipellis* Grote, but the veins distinctly lined in black.

Family NOTODONTIDÆ.

Dicentria minotelis, new species.

Fore wing gray, reddish at base along inner margin; a black dash at base below median vein; lines obsolete; a curved black mark on the discal cross-vein; a white, somewhat waved shade across the discal veinlets in the position of the outer line, beyond which is a reddish shade overlaid with blackish between the veins subterminally; a white spot following the dark streak between veins 2, 3 and 3, 4. Hind wings white, tipped with gray at anal angle. Head and thorax dark gray the posterior tuft shaded with vinous and tipped with black. Abdomen ochraceous brown, the tip lighter, the basal tuft gray. Antennæ testaceous. Expanse, 38 mm.

One male, Mexico City, Mexico, June, 1907 (R. Müller, No. 1036).

Type. — No. 10458, U. S. National Museum.

Nearly allied to *D. linita* Schaus from Jalapa, Mex., but the ground color is uniform dark gray and the hind wings are white.

Apatelodes amaryllis, new species.

Olivaceous ochraceous, the veins light; a black bar in the basal space from near the base to the inner line above vein 1; a slight blackish shade below vein 1; inner line whitish, rather broad, oblique from costa to origin of vein 2, then perpendicular to inner margin; an olivaceous blackish shade bordering its upper part, leaves it at the angle and crosses to the outer line, cut by the ochraceous veins 2 and 3; outer line white, strongly, narrowly outcurved over veins 4 to 6, inwardly arcuate between veins 2 to 4, edged within by a defined olivaceous blackish shade which defines a large, round, pale space beyond the end of the cell, bisected by the ochraceous vein 5; an oblique costo-apical white mark, preceded by two black wedge-shaped spots; an olivaceous blackish shade along the outer margin, touching the outer line between veins 4 to 6, cut by the ochraceous veins. Hind wings blackish gray shaded, divided by a whitish line that is angled on vein 5; a black spot on inner margin at the termination of this line; basal half of wing more blackish than outer half, except for a rounded area on inner margin which is ochraceous; outer area cut by ochraceous veins; the line is at about the middle of the wing. Beneath the fore wings have a faint white subterminal line, the costo-apical white mark repeated, but followed instead of preceded by black. Hind wings with an outer white line starting on costa near middle of wing but at once curved outward and becoming submarginal at the anal angle; a blackish line is contiguous with it on costa but separates at vein 5, touching again at anal margin; a blackish shade within to base above vein 2. Patagia and center of thorax lined with black; palpi and pectinations of antennæ black, else olivaceous ochraceous. Expanse, 38 mm.

One male, Mexico City, Mexico, June, 1907 (R. Müller, No. 1035).

Type. — No. 10459, U. S. National Museum.

Not nearly allied to any species known to me.

Family LASIOCAMPIDÆ.

Dendrolimus prosper, new species.

Thorax and fore wings chocolate brown, overlaid with grayish; basal half of wing dark, crossed by two wavy, ill-defined lines, between which the ground color is somewhat lightened or yellowish; a round whitish discal dot; outer half of wing lighter, a brown line limiting the dark color, curved at costa and slightly dentate; a brownish line, between which and the subterminal dots the ground color is again yellowish; subterminal dots rounded, blackish, strongly waved in their course. Hind wing dark reddish brown. Below much the color of the hind wings above, a faint dark mesial line on both wings, limiting the somewhat darker basal area, followed by a second faint darker line. Expanse, ♂ 70 to 80 mm., ♀ 95 mm.

2 ♂♂, 1 ♀, Orizaba, Mexico (R. Müller, No. 901; Wm. Schaus coll.).

Type. — No. 10446, U. S. National Museum.

The species is nearly allied to *Eutricha conradti* Druce, but the fore wings are not so narrow and the hind wings are not so strongly excavated on the costal edge. The markings also are much more distinct, being without the blurring yellow shades of *conradti*, while the lower side of the thorax and abdomen is not heavily shaded with blackish brown; the subterminal spots of the fore wings form a continuous row in the ♂ and are more irregular in position.

The female is larger and paler than the male, but essentially similar; the subterminal dots of the fore wing are partly wanting, but their irregular course is marked by the contrast between the yellowish subterminal shade and the darker terminal color.

Clisiocampa luteimargo, new species.

Pale straw yellow; fore wings with two parallel dark brown lines, the outer slightly wavy, the space between them more or less filled in with brown irrorations, sometimes almost solidly so; hind wings with the basal half faintly brown shaded, the outer half clear straw-yellow. Beneath straw-yellow, a common mesial brown line, within which the basal half of both wings is more or less completely filled in with brown shading. Expanse, ♂ 27 to 32 mm., ♀ 37 mm.

3 ♂♂, 2 ♀♀, Mexico City, Mexico (R. Müller, No. 885; Wm. Schaus coll.).

Type. — No. 10447, U. S. National Museum.

The species is allied to *fragilis* Stretch, but I have seen no form of that species in which the margins of both wings above and below were without irrorations. It is also allied to *azteca* Neumoegen, but has a very different appearance, and none of my 26 *azteca* vary in this direction.

Family GEOMETRIDÆ.

Pygmæna simplex, new species.

Brownish gray, violaceous tinted; the fore wings have two broad smoky brown lines, the inner faint, the outer far removed from the margin; a rounded discal dot on both wings. Expanse, ♂ 26 mm.; ♀ 19 mm.

Eleven specimens, 10 ♂♂ and one ♀, Laggan, Alberta, Canada (Wm. Barnes, Dyar and Caudell), Yellowstone Park, Wyoming (W. D. Kearfott through G. W. Taylor).

Type. — No. 10442, U. S. National Museum.

This is the first record of the genus *Pygmæna* Boisd. in America. A single species is known in Europe, *P. fusca* Thunberg, with an Alpine distribution. Our species is larger than the European form, paler colored, less brownish, and the female is more nearly the color of the male. The females in both species have the wings partly aborted and are more yellowish in color.

Ripula virginaria Hulst.

This species was described from Florida and I have not any specimens before me, yet it seems from the description so near to the Cuban form of *Sericoptera mahometaria* Herrich-Schaeffer that I doubt if they are distinct. There appear to be two species under this name, one smaller, less strongly marked, the antennæ of the male heavily pectinated and yellow, which I have referred to as the Cuban form; the other larger, more strongly marked, the antennæ shortly pectinated and dark brown. The latter occurs in Mexico, Peru, Brazil and also in Cuba. This is doubtless the true *mahometaria* (*Sericoptera* = *Ripula* Guen.), which was described from Venezuela. Hulst's measurement* of *virginaria* agrees with the true *mahometaria*; his description with the Cuban form. Mr. J. A. Grossbeck kindly informs me that the type of *virginaria* is in the Hulst collection at New Brunswick, N. J., and that the pectinations of the antennæ are as long as in *vestalis*, the markings agreeing with Mexican specimens of *mahometaria* before him in design, but being less strongly developed. *R. virginaria*, then, will stand as a good species, inhabiting southern Florida and Cuba, where it overlaps the range of *R. mahometaria*.

Ripula vestalis Hulst.

I have two specimens of this species from southern Florida, one collected by myself at Jupiter, Florida, February 21, 1890; the other from Cudjo Key, taken by Mr. Pollard. The species has been recently redescribed as *Gonorthus bilineata* by Mr. Warren (Proc. U. S. Nat. Mus., XXX, 543, 1906). Mr. Warren's type is from French Guiana, but it agrees entirely with the Florida specimens.

Amphidasys exoticaria, new species.

Wings brownish gray and pure white; costal half of basal space brown, dotted with black; followed by pure white to the inner line; median space brown, limited by the two lines, black, the inner curved, dentated on median vein, the outer dentated on all the veins, most strongly so on veins 3 and 4; a small white discal dot, outlined in blackish; a blackish shade paralleling the outer line below vein 2; space beyond the outer line white, with two rows of brown blotches partly confluent and a few scattered black irrorations. Hind wings white, irrorated with partly confluent brown dots to the submedian line, which is black, angled on vein 4; outer space white, with two rows of brown blotches as on the fore wings, broken between veins 3 and 4. Beneath the markings are repeated, somewhat whitish. The top of the head, front of thorax, base of abdomen, sides and tip of abdomen white, the rest brown and blackish ; abdominal tufts dark brown. Expanse, 64 mm.

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* The measurement given by Hulst is apparently too large. The type is in fragments, but on placing the pieces together the specimen seems no larger than Cuban specimens. Mr. Grossbeck agreed with me.

One female, Mexico City, Mexico, June, 1907 (R. Müller, No. 1034).

Type. — No. 10456, U. S. National Museum.

The specimen agrees almost exactly with Felder and Rogenhofer's figure of *Amphidasys cladonia* (Plate CXXV, Fig. 13), the marginal spottings being only somewhat more extensive. Were it not that the locality for *cladonia* is given as "Silhet" I should think that the species was before me.

EUCYMATOGE RECTILINEATA, A NEW GEOMETRID MOTH FROM COLORADO.

BY GEO. W. TAYLOR,

WELLINGTON, B. C., CANADA.

This species belongs to the group containing in our fauna *E. intestinata*, *gillettei* and *vitalbata*, and to which the generic name *Phibalapteryx* Stephens, used to be applied. It resembles *vitalbata* more nearly than it does *intestinata*, but it is smaller, and the colors are less sharply contrasting. It may be separated at once from any of the three species mentioned by the *straightness* of the extra discal line.

I have had a single specimen of this species in my cabinet without name for a considerable time. The discovery of a second specimen, exactly similar, in the collection of the U. S. National Museum, determines me to describe the form as new.

Eucymatoge rectilineata, new species.

Expanse 25 mm. Prevailing color of wings, warm chocolate brown with the costal and basal areas and the hinder portion of the submarginal band lighter as in *E. vitalbata*. The hind wings are uniformly of this lighter color and not blackish in the median band as in the last named species. The fore wings are crossed by numerous lines as in the other species in the group, but in *rectilineata* the extra discal line runs in an almost straight line from vein 3 to the center of the inner margin and not in a series of scallops. The hind wings are clearer than in the other species, and the lines are pale on a darker ground.

Described from two specimens, one bearing label "Colorado, Las Pinas, 30 May," is in my own collection and the second labelled "Durango, Col., July 8–15," is in the U. S. National Museum and bears their type No. 10371.

DESCRIPTIONS OF THREE NEW TORTRICIDÆ FROM MEXICO.

By AUGUST BUSCK,

WASHINGTON, D. C.

Archips audaculana, new species.

Labial palpi, face and head deep yellow mixed with red; antennæ brown; thorax whitish brown. Fore wings of female with costal edge strongly arched at base and with apical half strongly concave; apex somewhat protruded; termen sinuate below apex and bulging out below; dorsal edge straight; light deer brown, faintly and evenly dotted with scattered black atoms; at basal third is an indistinct, outwardly oblique, costal streak of a somewhat darker brown; just before the middle of the wing is a similarly colored larger oblique costal streak, terminating on the fold, and at apical third is an outwardly angulate faint darker brown fascia across the wing diffused on its outer edge and more or less suffusing the entire apical part of the wing.

Hind wings whitish, mottled on apical half with ill-defined transverse dark fuscous spots; under side with brown striation along costal and apical edges and with three or four more prominent dark fuscous round dots in a longitudinal line on the middle of the wing. Alar expanse, 30–33 mm.

Habitat. — Orizaba, Mexico (R. Müller, collector); Jalapa, Mexico (W. Schaus collection).

Type. — Female, U. S. National Museum, No. 10925.

This species evidently comes near *Archips* (*Cacœcia*) *patulana* Walker (Cat. Lep. Het. Br. Mus., XXIII, 325, 1864). Besides Lord Walsingham's figure of *patulana* (Ill. Lep. Het. Br. Mus., IV, Plate LXI, Fig. 1, 1875) I have a recent hand painted figure, made from the type in the British Museum. There are several discrepancies between these two figures but they both agree with the descriptions of Walker and Walsingham in having immaculate hind wings. This then will furnish probably the easiest point of distinction from *audaculana*, which has transverse blackish striation on both sides of the wing. *Audaculana* moreover is a smaller species with more whitish hind wings.

Tortrix animosana, new species.

Labial palpi, head and thorax deep golden saffron yellow. Antennæ slightly annulated with fuscous. Ground color of fore wings deep golden saffron, broken by an extensive, irregular, sharply limited, light purplish-yellow design, emphasized by a conspicuous striation of deep black transverse lines; this darker design covers more than half the wing area; it extends over basal third of the wing except for an unmottled yellow costal spot at base; then it narrows to a central streak, which broadens out again at the end of the cell and sends one broad branch obliquely backwards to the middle of the costal edge and another to the middle of the dorsal edge; a third broad branch, connected with the central blotch only at one corner goes perpendicularly down to dorsal edge just before termen and a fourth equally narrowly connected branch reaches costal edge at apical fourth and sends a spur downwards and outwards, which nearly reaches the terminal edge. Just before apex are a few transverse black striæ. It might be more convenient to describe the duller black speckled color as ground color on which then the golden saffron color shows as there costal and there dorsal finger-like recurved spots nearly, but not quite meeting in the middle of the wing. Hind wings light golden saffron. On the under side of the forewings the dark design is slightly indicated and emphasized on costal edge by dark striation; hind wings have on the under side some scattered costal and apical striation. Abdomen and legs dull saffron. Alar expanse, female, 30–33 mm.

Venation typical with 12 veins in forewings; 7 and 8 separate; 7 to termen; 2 from before apical fourth of cell. Hind wings with 3 and 4 connate, 6 and 7 closely approximate; submedian vein not hairy.

Habitat. — Orizaba and Jalapa, Mexico (Wm. Schaus collection).

Type. — U. S. Nat. Mus., No. 10926.

Tortrix auricomana, new species.

Labial palpi and tongue deep golden saffron; antennæ golden yellow, annulated with fuscous. Face, head and thorax deep golden yellow. Fore wings light straw yellow, evenly striated with thin black transverse lines and with entire costal, terminal and dorsal edge golden saffron; reaching from base of wing to apical third is a golden yellow streak along the subcostal vein and through the middle of the wing is a similar longitudinal streak beginning just before the end of the cell and terminating shortly before terminal edge of the wing; below this streak is a round golden saffron dot. Cilia golden. Hind wings light saffron yellow with a deep yellow hair pencil on vein *1b*; submedian vein not hairy. Under side of both wings saffron yellow with costal and terminal parts slightly irrorate by short black transverse striæ. Abdomen and legs deep saffron yellow. Alar expanse, female, 30–34 mm.; male, 26–27 mm.

Venation as in the foregoing species.

Habitat. — Mexico City, Mexico. May and June (R. Müller, collector).

Types. — Male and female, U. S. National Museum, No. 10927.

◆

A NOTE ON SYNONYMY.

Through the courtesy of Mr. A. Cosens, of Toronto, Canada, the U. S. National Museum has lately obtained topotypes of *Retinia austriana* Cosens (Can. Ent., XXXVIII, 362, 1906) in the author's own determination. The species proves to be a Phycitid, which Dr. H. G. Dyar has identified as *Pinipestis zimmermanni* Grote.—AUGUST BUSCK.

Class I, HEXAPODA.

Order XI, ORTHOPTERA.

A NEW CYRTOXIPHA FROM THE UNITED STATES

By A. N. CAUDELL,
WASHINGTON, D. C.

The genus *Cyrtoxipha* is represented in the United States by two small species hitherto reported only from the southern states. These are *gundlachi* and *delicatula*. The latter species I have taken in the District of Columbia and Mr. Banks has taken it at Falls Church, Va. *Gundlachi* is in the National Museum from Florida and from Cuba.

A third United States species has just been discovered. It may be known as *C. columbiana* and can be distinguished by the following table:

TABLE OF UNITED STATES SPECIES OF CYRTOXIPHA.

A. Color yellowish green; wings decidedly less than twice as long as the elytra.
  B. Smaller and more slender; ovipositor of the female apically armed with acute serrations; dorsal area of the female elytra with inconspicuous cross veins. *gundlachi* Sauss.
  BB. Larger and stouter; ovipositor of the female armed apically with blunt tubercles; dorsal area of the female elytra with more conspicuous cross-veins. .... *columbiana* n. sp.
AA. Color reddish brown; wings twice or more than twice as long as the elytra. *delicatula* Scudd.

Cyrtoxipha columbiana, new species.

Color uniformly yellowish green except the ovipositor of the female and the eyes of both sexes, which are black. The anterior tibia is moderately swollen at the tympanum, which is distinct on both faces. Antennæ long and slender, unbanded, darker apically. Pronotum almost twice as broad as long, broader posteriorly, and above slightly flattened, the posterior margin a little rounded. Elytra ample, surpassing slightly the tip of the abdomen, the cross-veins of the dorsal area of the female more conspicuous than in our other species of the genus. Wings caudate, about one half as long again as the elytra. Ovipositor curved upwards and apically armed above with several minute tubercles, below nearly smooth; at the extreme base the ovipositor is reddish yellow but beyond that it is piceous.

Measurements, ♂ and ♀: Length, of body to apex of the elytra, 8.5 mm.; pronotum, 1.5 mm.; elytra, 6 mm.; wings, beyond the tip of the elytra, 3 mm.; posterior femora, 5.5 mm.; ovipositor, 3.5 mm.

Described from one female, taken in Washington, D. C., on September 21, 1907 by Mrs. Nellie Caudell, and one male, taken at Falls Church, Va., on September 14, 1907, by Mr. Banks.

Type. — ♂ and ♀, U. S. National Museum, No. 10919.

As indicated by the above key this species is most nearly allied to *C. gundlachi* but its larger size will readily serve to separate it from both that species and *C. delicatula.*

GENERAL.

THE SPECIALIST.

By A. N. Caudell,

Washington, D. C.

Broadly speaking the general zoölogist is as old as history, but the specialist as now known is a product of the last century. In the days of Ray and Linnæus, when the known species of even large groups were numbered in scores only, the specialist was unknown and unneeded. The naturalist of a little more than a century ago could cover the entire field of zoölogy, considering the forms down to the species. For any one at the present time to attempt covering the same field would be preposterous. The general zoölogist of to-day must deal with his subject as classes and groups, descending to genera and species only occasionally for purposes of illustration. If he deals with species he either proves superficial or chooses a restricted field to labor. In other words he becomes a specialist, for the field of zoölogy is now too large for any one person, no matter how brilliant, to master in its entirety.

It is the innumerable contributions to knowledge made by the specialist that have brought the ingenious but crude systems of Linnæus and Cuvier to the present state of comparative perfection. The advancement of zoölogy as a whole depends upon the knowledge of the species, and it is the specialist, confining his efforts to restricted fields, that is responsible for the proper researches being made. The smaller the field, other things being equal, the more thoroughly can it be covered. We cannot know all things, so let us know something, but know it well.

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BOOK NOTICE.

A monograph of the Culicidæ of the World. By F. V. THEOBALD: London, 1907. Volume IV.

After an interval of four years, Mr. Theobald appears with a fourth volume of 600 pages of his mosquito monograph, based on material received since 1903. It might have been supposed that during this interval the author would have learned something from the numerous criticisms that have been directed against his earlier volumes; but not so. In this book he continues his excessive subdivisions, his absurd classification, and even his nomenclatorial blunders that so marred the first volumes. Mr. Theobald is not a trained naturalist, so we are told, and it now appears that he is incapable of learning. He insists that his additional material only confirms his divisions on scale characters. Naturally it does so from his point of view. He can no doubt place his specimens to his own satisfaction on these characters, since this is the only criterion he has. But does this prove anything? Can anyone else use the characters and come out the same way? Do they correspond to a natural system? Do they agree with characters founded on other structures? Are they confirmed by larval characters? We answer, no. Rightly viewed, the scale characters are of specific value only, and any attempt to employ them for higher taxonomic groups, must result in confusion and disaster.

Mr. Theobald remarks that the larvae have "a wide range . . . in characters, not only in different stages of the same species, but in the same stage in the same species." This is not a fact. Mr. Theobald is utterly unqualified to speak on the subject, being ignorant of the first principles of larval characters, as his published figures show. He has never published an original figure of a larva that showed a diagnostic character, nor is he apparently able to apprehend them when pointed out. The phrase "not only in different stages" would imply that some of the larval differences pointed out by students of the early stages might be due to a difference of stage rather than of species. Possibly Mr. Theobald might be deceived in this way, but it is absurd to imply that any real student of the matter does not know when a larva is mature.

Mr. Theobald deserves censure for his uncandid treatment of his own faults. Other peoples synonyms are set forth in large type, but his own are either ignored, or referred to in the text inconspicuously. In the introduction he commends Professor Blanchard's book as "of especial value for correcting errors in nomenclature;" but omits to state that practically all the errors there corrected were perpetrated by himself. In a monographic work of world-wide scope and general distribution, where, unlike in a scientific journal, no reply is possible to the same readers, this sort of thing is a rank injustice. It creates the impression that other authors may make many faults, but not the author of the monograph!

He does not hesitate to steal names. Numerous manuscript names are published with descriptions, apparently without the consent of the authors, as he frequently states that he does not know whether the author in question has described the species or not. In the volume before us we find a small inserted slip headed "Errata et Addenda," on which we read of *Myzomyia rossii* Giles that it belongs to a distinct genus which *is being described* by Mr. Rothwell as *Pseudomyzomyia.* The genus, of course, will now have to be credited to Theobald, and Mr. Rothwell can only regret his misplaced confidence in having mentioned his intention before publishing.

Mr. Theobald speaks unfavorably of genera founded on male genitalia alone; justly, we think. He quotes Dr. Felt's work and Dr. Dyar's on the subject, but in a note on page 12 makes the strange statement "the type of the genus *Grabhamia* I made *jamaicensis.*" As a matter of fact he made no type; *jamaicensis* was first specified as type by Dr. Felt. Under the first species rule the type is *dorsalis*, as stated by Dr. Dyar. This Mr. Theobald has failed to comprehend.

Mr. Theobald objects to Dr. Dyar's statement that *Janthinosoma musica* and *Grabhamia jamaicensis* should fall together, adding "more totally diverse forms could not be seen." Now they are diverse only in his own opinion. These species agree in egg and larval structure and in the male genitalia. In our classification they both fall in the genus *Aëdes*. In short, they agree in all essential characters, and only differ in the unessential ones on which Mr. Theobald has chosen to found his classification. A better example of its unsoundness could hardly be adduced. He refers to the placing of his *scholasticus* in the genus *Janthinosoma* by us on larval characters as an example of the faulty working of our system; but fails to note, as is fairly obvious from the context, that this was due to an erroneous determination made for us by Mr. Coquillett. We have since renamed the form.

Mr. Coquillett's classification is commended, so far as the Theobaldian characters are used, but the most valuable part of it, the treatment of the genus *Ochlerotatus*, is condemned, while Theobald himself makes no use of this old name.

Dr. Lutz's classification has been adopted, which is an improvement; it is at least orderly. Ten subfamilies are recognized, based as formerly on secondary sexual characters, venation and bending of the proboscis. The only really valuable character, the presence or absence of setæ on the metanotum, is obscured and used in a secondary manner. The curious relationships between the predacious species and their hosts are not brought out, for while *Lutzia* stands near *Culex*, and *Psorophora* near *Janthinosoma*, *Megarhinus* and its near relative *Mansonia* are widely separated. In spite of the multiplicity of genera, forms are associated in one genus which have no near affinities. One hundred and nine genera are recognized. It is true that genera do not exist in nature and are only artificial divisions; but they are supposed to be for the convenience of the student, not for his confusion and undoing. There ought to be some sort of uniformity with other groups of Diptera and other insects in general as to the scope of the division called the genus. Mr. Theobald appears to be unprepared for his work on general principles; having no knowledge of any group but mosquitoes he unduly magnifies their trivial characters. It is probable that he cannot be brought to see the error of his ways, but will continue to overdo the subject as long as the British Museum keeps him at the work. A fifth volume is said to be in active preparation and there seems no way to avert the calamity.

In the following detailed remarks, we refer mainly to American species, as the others are unknown to us. Unfortunately the American species form but a small proportion of the whole.

The subfamily Anophelinæ includes eighteen genera, of which a table is given. They are separated on scale structure, of which enough criticism has already been published. These groups do not represent subgenera even, nor any natural groups less than genera. The modifications of scale structure, while of specific value, do not follow phyletic lines, but are mainly sporadic. This is the chief objection to Theobald's classification, that it is unnatural. Under *Anopheles*, *maculipennis* Meig., *bifurcatus* L. and *nigripes* Staeg., three European species, are credited also to North America, quite wrongly we believe. *Barberi* is said to be probably a variety of *bifurcatus*, with which it really has no affinity. The species recently described by us are unnoticed. *Crucians* is included with doubt. According to his table we make it fall in *Anopheles*. Mr. Theobald's doubts about its generic position have arisen apparently from a misunderstanding of Professor Smith's descriptive term "scales." Our tropical species fall in other genera, except *eiseni* Coq., which the author has not seen. This would fall in *Myzomyia* by his tables apparently. *Myzorhynchella nigra*, new genus and species is described from Brazil and Mexico. We have it from British Guiana.

The subfamily Megarhininæ which, in the Genera Insectorum, Mr. Theobald split into two subfamilies, Megarhininæ and Toxorhynchitinæ, is now recognized as a concrete group with the remark: "that they are closely connected a casual glance will show, yet under palpal classification some should come (*Toxorhynchites*) near *Culex*, and others (*Megarhinus*) near *Anopheles*;" Ankylorhynchæ Lutz and Lynchiellina Lahille are given as synonyms — not a word of Toxorhynchitinæ Theobald! Fortunately but one new species of *Megarhinus* is described, *M. chrysocephalus*, from a single male from São Paulo, Brazil. "The legs in the specimen were damaged." As the diagnosis of the species of *Megarhinus* depends largely upon the markings of the tarsi, this species will remain an empty catalogue name. *M. herickii*, which is intended for the species previously described by us as *M. septentrionalis*, is again heralded forth as a new species, although previously described in the Entomologist. Mr. Theobald's original diagnosis was based on some remarks made by Herrick in Entomological News, and it appears that he never has had a specimen before him. In the present work the species is credited with a new, purely imaginary character, a bicolored caudal tuft. The paper published by us on the genus *Megarhinus* in September of last year and which puts the diagnosis of the species on a more tangible and concise basis is wholly ignored. Instead, hopeless confusion is created by attributing new characters to the old species. Thus *M. longipes* Theob., which was originally described from a single female with banded tarsi, is now diagnosed with "tarsals unbanded" and *M. portoricensis* von Röd., which is based on a single male without abdominal tufts, is now stated to have the "caudal tufts steel-blue and white."

The subfamily Culicinæ contains 63 genera and the author remarks "some more have been added since this went to press." *Oculeomyia*, with the eyes large and fused in the mid line, and *Rachionotomyia*, with a large backwardly projecting process on the scutellum, are evidently strongly marked forms, worthy of generic rank; but the others, separated on scale and palpal characters, are weak, artificially separated groups, and are for the most part not valid genera. In the genus *Janthinosoma*, our identification of *posticata* Wied. is, we believe, correct, as Dr. Howard has examined the type and there is nothing in Wiedemann's original description to contradict our understanding of the name. The confusion is entirely due to Mr. Theobald's misapprehension of the term "tarsus." The new name *coquilletti* Theob. will stand as a synonym of *posticata*. The name *terminalis* Coq. will have to stand for the form misidentified as *posticata* by Theobald. Coquillett's original description of *varipes* is quoted, but our correction from a reëxamination of the type is not noticed. The new name *sayi* is proposed for *musica* Say (not Leach). We had previously made the same substitution. The variety *jamaicensis*, described as new, was previously named *echinata* by Dr. Grabham.

Under *Desvoidea*, a whole page is occupied with photographs of the head and anal end of the larva of *D. obturbans*. It is unfortunate that every character of value is completely obscured in the mount, and the illustrations are worthless. Under *Stegomyia*, Theobald recognizes that the name *fasciata* Fab. cannot be used, but he retains the name nevertheless "to avoid endless confusion." It appears to us that this only increases the confusion, since all recent writers have abandoned the name *fasciata*. A figure is given labeled "male genitalia of *Stegomyia simpsoni* Theobald." The side pieces and clasp filament are shown and two basal hairs. Are we to infer that this species is devoid of harpes, harpagones and unci? If so, we wonder it has not been made the basis of a subfamily.

The new genus *Pseudohowardina* is proposed for our *trivittata* Coq., on scale characters entirely.

A figure of the male genitalia of *Culiciomyia inornata* Theob. is an unintelligible muddle. We see a clasp filament on the left, on the right an unattached piece which looks as much like a distorted set of marginal processes of the side piece of a *Culex* as anything. *Culiciomyia annulata* Theob. is likewise figured and almost equally unintelligible. It is a pity that the structures were not better drawn, as they are apparently peculiar.

The description of *Gnophodeomyia inornata* Theob. in the Journal of Economic Biology had escaped us; but specimens received from Dr. Rowland appear to be an ordinary *Culex*. The new genus *Protomacleaya* is made for our *triseriatus* Say. A portion of the male genitalia of *Pecomyia maculata* Theob. are shown, just enough to excite our interest, without conveying any valuable information. Again these parts of *Pseudotheobaldia niveitæniata* Theob. are figured with the essential parts slurred over by the artist, so as to be unrecognizable. Of *Grabhamia willcocksii* Theob. more is shown, but not all. Apparently none of Mr. Theobald's preparations are properly made, except perhaps that of *Culicada waterhousei* Theob. which is almost recognizable.

The genus *Culicada* Felt is used for 24 species. Mr. Theobald says "the type of this genus should be Meigen's *cantans*, not my *Culex canadensis*." But as Felt specified *canadensis* as the type, the remark is meaningless, except as illustrating the author's ignorance of all rules of nomenclature. *Subcantans*, *fitchii* and *abfitchii* are separated by the markings on the thorax, and large figures are given of them. This is all very well for single specimens, but with long series of each species before us we have been unable to determine any constant diagnostic characters between the three species. *Onondagensis* Felt is included and called "evidently a very distinct species," yet he has failed to observe that it is a synonym of *curriei*, which he places in *Grabhamia*. *C. trichurus* Dyar and *C. cinereoborealis* Felt are treated separately, but are really one species. Under *C. punctor*, we are told "the American observers take a wholly different insect to be *punctor* to that placed in the Museum collection;" but not a character is given to enable us to correct our error, if indeed Mr. Theobald means to imply that we are in error, which is not at all clear from the peculiar wording. *Punctor* is even carefully omitted from the table, which, by the way, is stated to be "complete."

Culiseta Felt is used, although it is synonymous with *Theobaldia*; but Mr. Theobald has "been unable to work out the two included species," from lack of time, we suppose.

Culex, as now restricted, has very nearly the same extent as defined by us, the genitalia being referred to. Some discordant elements are included, such as *atropalpus* Coq., *sylvestris* Theob., *niveitarsis* Coq. (which may be only an aberration of *canadensis*, as Miss Ludlow has suggested to us), *tortilis* Theob. and *inconspicuus* Grossb. for most of which there is no excuse, as sufficient data have been published to exclude these species from *Culex* if Mr. Theobald had chosen to notice the literature. He states that the genitalia of *sylvestris* "are no more varied than one finds in other closely related species of *Culex*," which is certainly a remarkable statement, as Felt has founded a genus on them. They are in reality very aberrant. *Culex subfuscus* is founded on a single male. Anyone familiar with the species of *Culex*, their very close affinity and the diversity of the sexes will appreciate the impossibility of associating the proper female with this form. *Culex similis*, which was originally founded on females from Jamaica, now receives a supplementary description of a male from British Guiana. We feel sure that this is really not the same species, for in our experience, with the exception of one or two semi-domestic species, those found in the West India Islands are distinct from those of the mainland. *Culex quasisecutor* is merely a maculate form of *secutor* and not a new species. A similar variation occurs in *C. restuans* Theob. and again in *C. territans* Walk.

Protoculex Felt is used for *serratus*, *dupreei* and a new species, *quasiserratus*, the latter obviously a synonym of *pertinax* Grabham.

The appendages of the male antennæ in *Lophoceratomyia* are most curious, but it is very doubtful if the genus is a good one, as these characters are not correspondingly developed in the female.

Tæniorhynchus is somewhat restricted and, as it stands, seems to represent a natural group, at least as far as the species known to us are concerned. The name, however, is obviously wrong according to the canons of nomenclature. The type is *tæniorhynchus* Wied., by the rule of tautonomy, and the question of the identification of Arribalzaga's specimens is outside the matter. The name rightly should replace *Culicelsa* as used by Theobald.

Chrysoconops Goeldi is used for nine species, of which *fulvus* Wied. is the only one known to us. This has been considered a *Psorophora* by Mr. Coquillett, from the single specimen which has outstanding scales on the legs. This character, however, is entirely without value in generic diagnosis, and we agree with Mr. Theobald that *fulvus* is not a *Psorophora*. It is, in our opinion, an *Aëdes* near *bimaculatus* Coq., and the genus *Chrysoconops* should be placed as a synonym of *Aëdes*.

The Uranotæninæ (credited to Miss Mitchell instead of Lahille, 1904 !) are recognized as a subfamily, with the definition "first fork-cell is *very small*, always smaller than the second posterior cell." Nevertheless, in the table *Mimomyia* Theob. is included with "first fork-cell nearly as large as the second posterior cell," which begins to cast doubt on the subfamily character, and finally this is completely vitiated by the inclusion of *Anisocheleomyia* (?) *albitarsis* Ludlow with "first sub-marginal cell nearly a half longer . . . than the second posterior cell." That is, in order to find a species by Theobald's book, we must look in a subfamily and genus from which, on his own definitions and tables it is positively excluded !

We are unable to distinguish *Uranotænia minuta* Theob. from the previously described *U. lowii* Theob., nor are specimens before us from Georgetown, British Guiana (the type locality), which have been kindly communicated to us by Dr. Rowland, to be distinguished. Probably Mr. Theobald has "forgotten" that he had already described the species, and so gave us a second name.

Lepidoplatys Coq. is used for *squamiger* Coq. and *sylvicola* Grossb. (rightly *grossbecki* D. & K.), but the two are not separated, the description being taken from adults supplied by Dr. Felt. We might judge what they were by the locality, but this is not mentioned. *Squamiger* breeds in salt tide water on the coast of southern California, while *grossbecki* inhabits woodland pools in the Atlantic states. The larvæ of both are typical *Aëdes* allied to *canadensis*. A separate genus for these species is totally unnecessary.

Culex melanurus Coq. is referred to *Melanoconion*, and Mr. Coquillett is scolded for not placing it there originally. As a matter of fact, the genus *Melanoconion* had not been proposed when Coquillett published his *Culex melanurus*, and in his later work he did place it in *Melanoconion*, long before Mr. Theobald did so. This appears like a wilful misrepresentation. *M. annulipes* from Jamaica is described as new. The description is unfortunately inadequate for recognition and we are unable to place the species in our tables.

The genus *Pneumaculex* Dyar is used for *signifer*, and the author exhibits again his ignorance of the rules of nomenclature by calling the genus a *nomen nudum*. It is true that no descriptive matter that would enable Mr. Theobald to place the genus in his scheme of scale classification was given, but other characters were given and a type was specified. The genus was therefore properly established. To be consistent Mr. Theobald should add his *nomen nudum* label to many other genera, such as *Culex* Linnæus. But our author is never consistent, nor has he the judicial mind that will enable him to separate a scientific subject from personal preferences. The work of persons from whom he has had favors or commendation is referred to leniently or frequently quoted, while that of persons who have criticized his work is harshly spoken of or ignored. This can only result in serious detraction from the authority and scientific value of the volumes before us.

Under *Aëdes*, a new species, *nigrescens*, is described. We should say that it was properly a *Culex* with short palpi in the male, like other species we are familiar with; but as only the tip of the genitalia is figured, the most important organs remain unrevealed and we cannot feel certain.

Hæmagogus equinus Theob. is now placed in *Cacomyia* Coq., and the error of the original description is repeated, namely the statement that the claws are simple. They are really toothed, as we know from an examination of Dr. Grabham's other specimen, which the doctor has kindly loaned us, and from an examination of Theobald's type, which has been made by Dr. Howard.

Under the clumsy, redundant term Metanototrichæ-Heteropalpæ, the distinct group Sabethinæ is at last recognized. We have repeatedly insisted on this group as the only one deserving subfamily rank, but our remarks are unnoticed by Mr. Theobald, probably because too recent. His book, in the matter of detail, is fully a year behind its date of publication. The author has been overwhelmed by his wealth of material and the rapidity of the pace that has been set in the study of these insects. We are of the opinion that the name Sabethinæ should obtain for this group, as founded on the oldest included genus.

Lutz's table of genera is translated from the Portugese and copied, with sundry mutilations, which are not pointed out. Dr. Lutz is able to prepare a table in proper dichotomous form, but the translation would not lead one to think so. On page 593 a figure is copied from Goeldi which purports to be "Siphon of *Trichoprosopon nivipes* Theobald." That this really represents the larva of *Limatus durhami* Theob., probably makes no difference to our author, since apparently all larvæ look alike to him. It might, however, mislead some reader who was not acquainted with Dr. Goeldi's work.

Theobald retains *Trichoprosopon* (not *Trichoprosopus* Macq.) instead of *Joblotia* Blanchard, regarding the difference in termination as sufficient distinction. We do not concur in this view, the names meaning the same and being so similar as to cause confusion. Still this is a matter subject to opinion; but not so the use of *Joblotia* for a distinct genus, which is wholly unwarranted. That genus should be known as *Lesticocampa* D. & K.

The genera *Philodendromyia* and *Polylepidomyia* are placed here; but as both are stated to have the metanotum nude, this position is incomprehensible, unless indeed a deliberate attempt has been made to confuse the reader.

HARRISON G. DYAR.
FREDERICK KNAB.

U. S. NATIONAL MUSEUM, WASHINGTON, D. C.,
July 30, 1907.

NOTICE FROM THE NEWARK ENTOMOLOICAL SOCIETY.

The headquarters of the Newark Entomological Society on the fourth floor of the Newark Turn Hall were completely destroyed by fire in the early morning of June 3, 1907. The conflagration demolished not only the entire building, but resulted in the loss of three lives.

The property of the Society consisted of a forty drawer cabinet containing one thousand specimens of Lepidoptera and two thousand five hundred specimens of Coleoptera, mostly representing local forms, besides a small collection in other orders; also a book case with one hundred and ten bound volumes and three hundred and sixty-five unbound volumes and pamphlets. All of this property was consumed by the flames except a few books that were in the hands of members. This collection of publications and insects was the accumulation of over twenty years of the Society's existence, and as the loss was only partially covered by insurance it will be a long time before it can be replaced. Some of the books, perhaps, can never be obtained again.

The Society will be exceedingly grateful for any help in the way of rebuilding the library that may be given it. Entomologists are earnestly invited to send separates of their papers or other publications that they may have in duplicate, for which the costs of transmission will be gladly refunded. Until the Society is again established in permanent quarters parcels should be addressed to the secretary, at New Brunswick, New Jersey.

JOHN A. GROSSBECK,
Secretary.

PROCEEDINGS OF THE NEW YORK ENTOMOLOGICAL SOCIETY.

MEETING OF FEBRUARY 5, 1907.

Held at the American Museum of Natural History. President C. W. Leng in the chair with fourteen members and one visitor present.

The librarian, Mr. Schaeffer, reported the receipt of the following exchanges:

Canadian Entom., XXXIX, No. 1.

University of Montana, Bull. 37, Geological Series, No. 2.

The Polymorphism of Ants, with an Account of Some Singular Abnormalities Due to Parasitism. Prof. W. M. Wheeler.

Zeitschrift fur wissenschaftl. Insektenbiologie, II, No. 12.

Verhandl. d. k.-k. zool.-bot. Gessellschaft. Wien, LVI, Nos. 8 and 9.

The Insect World, X, No. 12.

The Solitary Wasps. Geo. W. and Elizabeth G. Peckham.

The treasurer made a report of the condition of the finances of the society.

Mr. Harris chairman of the auditing committee stated that the books of the treasurer had been audited and found correct and moved that a vote of thanks be extended to the treasurer for the care and solicitude exercised by him in the discharge of his duties during the past year. Motion carried.

Messrs. E. P. Felt, E. A. Bischoff, J. R. de la Torre Bueno, proposed at the last meeting for active membership and Professor J. B. Smith as corresponding member, were elected by single ballot on motion of Mr. Groth.

Mr. Dickerson spoke of some insects which had been brought to his attention as injurious during the past year in connection with his work at the New Jersey Experiment Station. Specimens of insects and work were exhibited. A small moth, *Penthina hebesana* Wlk., breeds in seed pods of *Iris*. Mr. Gibson in Canada has found this species breeding in heads of mullein. Apparently it breeds in several plants. It would be injurious only where the seed of the *Iris* are desired as was the case in one nursery.

Phylloxera caryæ-caulis Fitch forms galls in the twig and leaf petioles of hickory. In one place where this tree was planted along the street it had been injured by this insect causing the leaves to turn brown and fall off.

The pear-leaf blister-mite, *Phytoptus pyri*, was found in several localities on pear trees.

The pear psylla, *Psylla pyricola*, was somewhat injurious in one locality, not only because of its sucking out the plant juices but more particularly because of the smut fungus growing on the "honey dew" given off by the insect. This causes the foliage and fruit to become blackened.

The soft scale, *Eulecanium nigrifasciatum* was observed on peach trees in one locality and it injured the fruit as did the previous insect because of the abundance of smut fungus on the fruit and growing on the "honey dew."

A species of red spider was observed on oak and some other plants. In some instances the leaves of the oak were much injured by this species feeding upon them and causing them to turn brown and dry.

The rose bug, *Macrodactylus subspinosus*, was somewhat more abundant than usual.

The army worm, *Leucania unipuncta*, occurred at Woodbine and destroyed some ten acres of millet and other grain. Very few of the larvæ were parasitized.

Hyperaspis signata was abundant a year ago on the trees infested with *Pulvinaria* scale, feeding upon that, but this year it was found feeding on *Pseudococcus aceris* and undoubtedly will do much to check that insect as it did the cottony maple scale.

On question of Mr. Leng, Mr. Dickerson discussed the present condition of the mosquito campaign in New Jersey. He spoke of the amount of money available for the purpose and to what extent ditching had been carried on for draining purposes and of what noticeable results had already been obtained in the diminution of mosquitoes on Staten Island and various parts of northern New Jersey.

Mr. Matausch exhibited six species of *Catocala* moths which had been taken in Central Park during the past summer.

Mr. Barber exhibited a box containing some of the rarer Hemiptera-Heteroptera, obtained by him in the Huachuca Mountains of Arizona. He spoke particularly of the genus *Leptoglossus* and mentioned taking a new species of this genus there and another in Sioux Co., Nebraska, during the past summer. He also exhibited all of the members of the genus *Catorhintha* which are known to occur in the United States and told how they were distinguished from some of the closely allied genera of Coreidæ.

Mr. Leng exhibited some specimens of the family Lampyridæ belonging to the tribe Phengodini. He spoke of the fact that thus far nothing had been written of the female even by Dr. Le Conte and his specimens representing this tribe were all males. He requested information in reference to the females of any member of this tribe. Mr. Schaeffer stated that he had taken in Arizona the female of a new species of *Cenophengus* which belonged to this tribe and spoke particularly of the phosphorescence of this and other forms of Lampyridæ.

Professor Wheeler spoke of the work of Professor Showatasi, of the Imperial University of Tokio, Japan, with phosphorescent animals, and related how he had collected a great many forms in this country to which he had given a great deal of investigation. He had taken numbers of the females of *Phengodes* at Morgan Park, Chicago. On question of Mr. Southwick, Professor Wheeler discussed the theory of Professor Showatasi, explaining that the phenomenon of phosphorescence was caused by the fact that air admitted through the tracheæ penetrated certain fatty bodies, thus causing luminosity. It was not an oxidation process so far as known.

The president appointed the following standing committees:

Auditing: Messrs. Harris, Southwick and Dickerson.

Field: Messrs. Engelhardt and Davis.

MEETING OF FEBRUARY 19, 1907.

Held at the American Museum of Natural History. President C. W. Leng presided with seventeen members and two visitors present.

The librarian reported the receipt of the following exchanges:

Bibliography of Canadian Entomology. C. J. S. Bethune.

Mittheilungen de Schweiz. Ent. Gesellsch., XI, No. 5.

Entomologisk Tidskrift, XXVII, Nos. 1–4.

Canadian Entom., XXXIX, No. 2.

Revision of the American Moths of the Genus Argyresthia. Aug. Busck, Proc. U. S. Nat. Mus., XXXII, No. 1506.

Report on the Mosquitoes of the Coast Region of California, with Descriptions of New Species. Harrison G. Dyar, Proc. U. S. Nat. Mus., XXXII, No. 1516.

Philos. Soc. Washington, Bull. XV, pp. 1–26.

Entomologiske Middelser, Dec., 1906.

Bulletin Buffalo Soc. Nat. Sci., VIII, No. 4.

Mr. Davis presented the resignation of Mr. Alfred C. Burrill which was accepted on motion of Mr. Joutel.

The secretary read an invitation from the Seventh International Zoölogical Congress inviting the society to be represented by delegates at its next meeting to be held at Boston, Mass., August 19 to 23.

On motion of Mr. Davis, Professor Wheeler was elected as such a delegate.

Mr. Frank E. Watson exhibited some specimens of the typical *Philosamia cynthia* moths and a number of specimens of an aberrant form. He stated that the peculiar variety differs from the typical *cynthia* in having the area of both wings between the pink band and the narrow olive band along the outer margin with the black scales predominating so as to form a conspicuous wide black band on both surfaces. The apices are as in the typical form. About 75 of the cocoons were gathered in the fall of 1902 near Crotona Park. Part of these he gave to Mr. Chas. Myers who kept them during the winter in a cool room. The remainder which he kept were placed in a cold cellar and were hatched under the same conditions in which the normal forms were hatched out. Of Mr. Myers' lot two aberrant males hatched on the fifteenth and twenty-eighth of April, 1903. Of Mr. Watson's lot two aberrant males hatched on the fourth and nineteenth of August, 1903. Of 35 cocoons collected from the same locality late in 1903 all produced typical forms the following season. During the fall of 1904 he again obtained 30 cocoons from Crotona Park from which lot he obtained one aberrant female on May 9, 1905.

To supplement Mr. Watson's exhibit Mr. Joutel showed typical *cynthia* and also a variation with the body nearly white, the wings with a broad, transverse white band that lacked the inner border, and base of wings nearly white. He also showed examples of a closely allied species from Japan that is nearly like *cynthia* but has the transverse lines differently angulated and shows by the different structure of the cocoon, pupa and imago that they are distinct. This is known as *pryeri*. Specimens from India also shown differed from both of the above in makings and cocoons and were described as *insularis*. Another form shown was from central Mongolia having the outer transverse space a dark reddish brown, the wings not produced at apex but short and rounded, and the body nearly white. The cocoons are strikingly different from the others in shape, color and structure, being pure white in the female and bright rust-red in the male, and lacking the stem. The name of this species is undetermined. Mr. Joutel made some remarks on silk culture in connection with the cocoons of the above and other species and explained the difference between the open and closed cocoons and their respective value for silk. He spoke of his experiments of the last seven or eight years with some of the hardy silk worms of Asia and of their value as silk producers for commercial purposes in this country.

Mr. Leng exhibited a few Nitidulidæ and read the following notes in regard to their habits. The Nitidulidæ are commonly known as "sap beetles" and include those beetles which are always to be found in spring on stumps of freshly cut trees from which the sap is oozing. The family also includes a number of species and genera which are found about decomposing substances of various kinds They may be classified according to their usual occurrence as follows:

On sappy tree stumps and logs, the following genera are found: *Carpophilus*, *Colastus*, *Ips*, *Amphicrossus*, *Cryptarcha*, *Prometopia*, *Soronia* (except *ulkei*) and *Epuræa peltoides*. These genera are also found by sifting old leaves about tree stumps having perhaps been attracted to the locality by sap at some previous time.

On flowers the following occur: on nettles, *Brachypterus urticæ* and *Meligethes;* on Elder, *Cercus abdominalis;* on *Yucca*, *Carpophilus yuccæ;* on agave, *Anthonæus agavensis;* on Convolvulus (Bind weed), *Conotelus* (*C. mexicanus*, on greenhouse species); on *Brassica*, *Meligethes*.

On decaying animal matter especially greasy bones: *Nitidula* and *Omosita*.

On foreign dried fruits: *Carpophilus hemipterus*.

Under bark on mould: *Rhizophagus* and *Prometopia*.

On fungus: *Cychramus*, *Epuræa*, *Phenolia*, *Pallodes*, *Pocadius* (on *Lycoperdon*), *Oxycnemus* (on phallus or stink-horn only), *Cybocephalus* (in clusters on fungus-grown logs and on twigs), *Epuræa monagamia* (on small white globular fungus of pine).

On rotting fruit: *Stelidota geminata*.

In ants' nests under stones, *Saronia ulkei* (the ant being *Cremastogaster lineolata* Say, var. *lutescens* Emery).

On palmetto: *Smicrips palmicola*.

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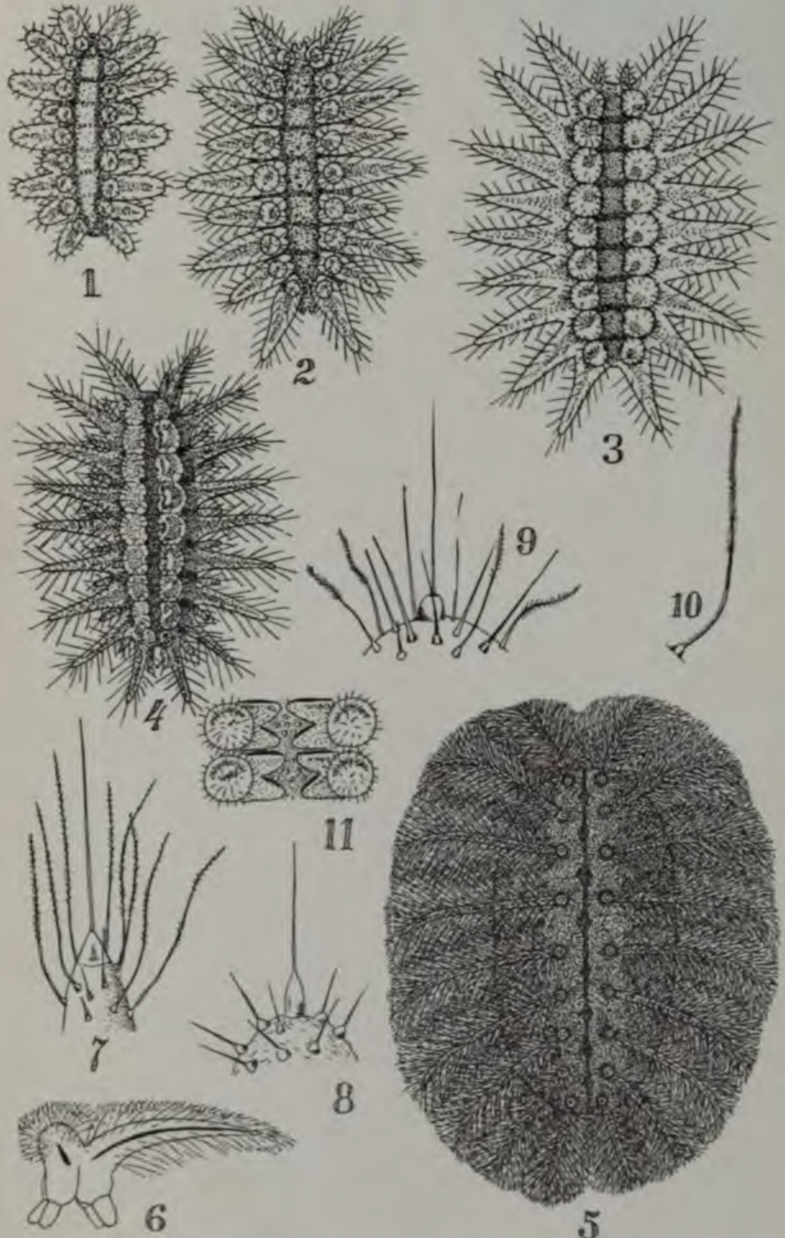

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